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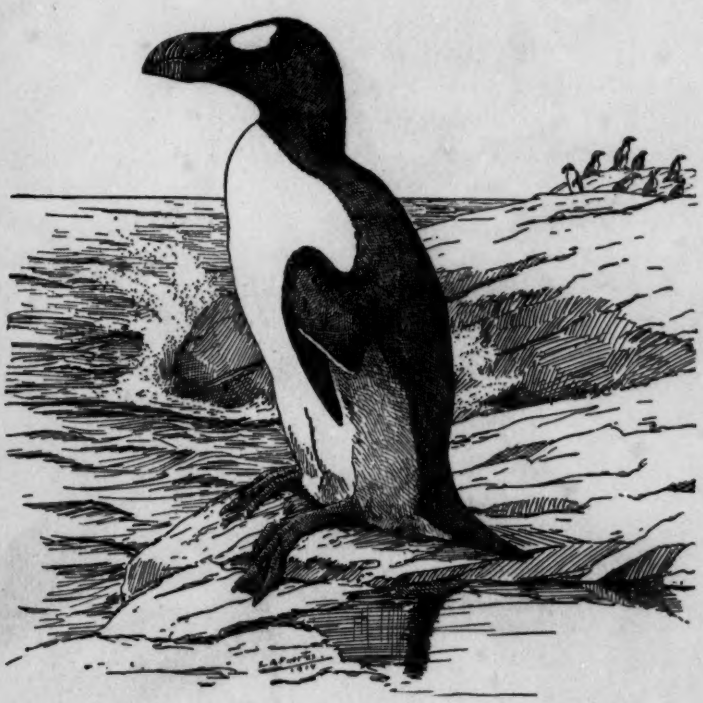

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THE AUK:

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VOL. XXXIX. OCTOBER, 1922. No. 4

A STUDY OF THE NESTING OF MOURNING DOVES.

BY MARGARET MORSE NICE.*

Plate XVIII.

THE campus of the University of Oklahoma is a particularly favorable place for the study of the nesting of the Western Mourning Dove (*Zenaidura macroura marginella*), for great numbers of this bird breed here. In August and September 1919, we found 37 nests, during the season of 1920 we located 124 nests, and in April, May and September 1921, 122. This study deals not with intensive observation of individual birds, but with statistics on these nests, the numbers of which were large enough to enable us to make averages and draw some general conclusions.

Norman is situated almost in the center of Oklahoma, its elevation is 1170 feet, and the yearly rainfall varies from 30 to 35 inches. The country is level prairie, now largely under cultivation, and almost the only indigenous trees grow along the creek beds. Both the town and the campus of the University have been liberally planted with trees, mostly elms and locusts, few of which are older than

*I wish to acknowledge my indebtedness to my husband, Dr. L. B. Nice, who went on many searches for Dove nests and to my daughter, Constance, who, with her unquenchable zeal for climbing the trees, was of indispensable assistance to me.

25 years, and most are younger. The Mourning Doves evidently prefer the grove environment of the campus to the same kind and sizes of trees on the streets of the town, for, although we have been on the lookout for nests of these birds wherever we have been, in 1919, 89 per cent of all nests seen were on the University grounds, and in both 1920 and 1921, 92 per cent were in this situation.

In order to avoid confusion among so many nests, I gradually evolved an elaborate system of records depending on a map of the campus, 10.5 × 14 inches in size, and a large notebook. I divided the campus into 26 divisions, each being designated by a letter; then on the map I marked the location of each nest by a number, using a new map each month and sometimes oftener. The notebook was divided into squares with columns for the number of the nest, its location on the campus, the kind of tree, height from the ground, position in a crotch or on a branch, and any peculiarity of the nest or parents. The rest of the columns were headed by the dates and hours of visit, and under each date it was noted whether the parent was brooding, the contents of the nest, if examined, behavior of the parents, size and position of the young, etc., or the fact of the destruction of the nest.

1. THE NEST.

Building the Nest. Nest building as a rule takes place in the early morning. The male Mourning Dove gathers the materials and carries them to his mate who arranges them. He takes one piece at a time, and if he happens to drop it, he does not stop but continues his journey to the tree and then starts over again. Dr. Chas. Whitman[1] says: "All pigeons, so far as I know, carry but *one straw* at a time; the sparrow, on the other hand, loads itself up with as many pieces as it can hold in its mouth, and thus saves trips to the nest. * * * In this simple difference of method we see a wide difference in intelligence." This laborious practice of one straw at a time is probably one reason why Doves' nests are such poor affairs.

[1] Behavior of Pigeons III, 1919, p. 22.

Material. The nests of Mourning Doves are notoriously frail structures, being simple platforms of dead grass, weeds, etc., and a few twigs. In three or four instances only, have the nests here in Norman been so scanty that the eggs could be seen through the bottom.

I examined the materials in three typical nests that had been deserted. Nest 7, found deserted April 23, 1921, with one punctured egg in it, was situated in a crotch of an elm 12 feet from the ground. The materials consisted of 6 twigs from 1 to 6 inches long and 148 pieces of dried grass, 4 of which were from 15 to 18 inches long, 33 from 8 to 6 inches, 27 about 6 inches and 84 were smaller.

Nest 33, on May 4, contained two eggs, while on May 9 it was empty. It was in a crotch of an elm on a very old Robin's nest, 12 feet from the ground. The materials were 3 twigs, 1 to 2 inches long, 10 weed stems, 4 to 10 inches long, and 145 pieces of dried grass, 3 of which were about 12 inches long, 28 varied from 6 to 10 inches, 34 were about 4 inches long and 80 were smaller.

Nest 41 was in process of construction May 9; contained two small young May 26, but was empty the next day. It was situated on the branch of an elm 10 feet from the ground. It was more substantial than the others and was made of 3 twigs about 8 inches long, 1 tiny twig, 40 pieces of dried grass stems and grass roots, 20 wild geranium stems, 40 pepper-grass stems and 31 little pieces of weed and grass—135 pieces in all.

Many of the smallest pieces were doubtless fragments of the original materials gathered, although the first two nests had not been used for long. If we assume that these smallest pieces represent two or three times as many pieces as were carried to the nest, we would have from 87 to 115 pieces carried to the first two nests, that were placed in crotches and from 115 to 120 to the last nest that was in a more exposed situation.

Trees Chosen. In 1919, we found 22 Dove nests in elms, 10 in locusts, 4 in osage orange, one in a box elder and one in a walnut; in 1920 there were 68 Dove nests in elms, 25 in locusts, 14 in osage orange, 4 in apples, 3 each in cedars and box elders, 2 in walnuts and one in a maple. In 1921 there were 79 in elms, 10 in locusts, 16 in osage orange, 3 each in maples and walnuts, 2 each in elder

and Russian mulberry, and one each in an apple and pine. The Doves seem to have nested about equally in all kinds of trees in proportion to their number except that silver maples (*Acer saccharinum*) of which there are many on the campus, are evidently not liked. Cottonwoods are avoided entirely so far as our experience goes. In 1921 the Doves utilized elms more and locusts less than the year before, which was probably due to a late frost that killed the locust buds and delayed their leafing out for nearly a month. (In 1920 the first nest in a locust was found April 18, but in 1921 none was seen until May 3, at which time these trees were in fairly full leaf.)

Height of Nests. Only twice in Norman have we found Dove nests on the ground. One of these was located in a corn field in June 1917, while the other, which was on the campus, contained eggs June 8, 1919.

The following table gives the numbers and percentages of nests found on the campus in 1920 and 1921 at different heights.

TABLE I.

HEIGHT OF MOURNING DOVE NESTS FROM THE GROUND.

	1920		1921	
Height in feet	Number of Nests	Per Cent	Number of Nests	Per Cent
3–6	12	9.9	0	0
8–10	31	25.4	36	30.4
12–20	72	59.0	80	68.0
25–30	7	5.7	2	1.6
	122	100.0	118	100.0

In both years about a third of the nests were placed at 10 feet or lower, and about two-thirds from 12 to 20 feet. In 1920 there was more variation than in 1921, more very low and very high nests. The average of the two years is nearly the same, 13.3 feet for 1920 and 14 feet for 1921.

Position of the Nests. Horizontal branches are more in favor with Mourning Doves for placing their nests than are the crotches of trees. The numbers that chose each position in 1920 and 1921 are shown in Table II.

TABLE II.

POSITION OF MOURNING DOVE NESTS.

	Branch		Crotch	
Year	Numbers	Per Cent.	Numbers	Per Cent
1920	71	65.1	38	34.9
1921	75	63.6	43	36.4

In both years about two-thirds of the nests were found on branches and one third in crotches. Yet in early spring a different relationship is shown; in April 1921 there were nearly as many crotch nests as branch nests—12 in the former and 15 of the latter, while the year before in April there were even more in crotches—15 nests—with only 12 on branches.

This would look as if the Doves sought protection in crotches when the leaves were small. Perhaps a shortage of suitable crotches may have something to do with the matter. Undoubtedly there are not enough to go around in the height of the nesting season; but in July, August and September 1920, when few Doves were nesting, only one-fifth of the 30 nests found were in crotches and in September 1921, all four nests seen were on branches. This choice of sites in late summer and fall lends support to the theory that desire for protection is the reason that crotches are preferred in April.

That the Doves are not wise in their preference for horizontal branches rather than crotches is shown in Table III.

TABLE III.

SUCCESSES* AND FAILURES IN RELATION TO POSITION.

	Branch Nests				Crotch Nests			
	Number		Per Cent.		Number		Per Cent.	
	Successes	Failures	Successes	Failures	Successes	Failures	Successes	Failures
1920	6	16	27.3	72.7	8	12	40.0	60.0
1921	11	26	29.7	70.3	13	6	68.4	31.6
Total	17	42	28.8	71.2	21	18	53.8	46.2

* We knew the outcome of nearly half the nests found. We counted as "Successes" those nests that contained young large enough to fly when last inspected.

On an average the crotch nests are almost twice as successful as those on branches, for slightly more than a fourth of the latter succeeded, while a little more than half of the former did. It is interesting how the Doves persist in preferring the less safe position.

The Use of Other Nests. Mourning Doves sometimes save themselves trouble by utilizing the nests of other birds. (In all but one of our cases, which was a new Robin's nest containing one Robin's egg, the doves had added more or less material of their own.) In 1920, twelve used old Brown Thrashers' or Mockingbirds' nests, three Robins', two English Sparrows', one a Bronzed Grackle's and two old Doves' nests; in 1921, there were eight old Thrashers' nests used, five old Robins', three new Robin's and two old Doves'. Table IV shows the numbers of these nests and the percentage they form of all the nests found in 1920 and 1921; the numbers of these nests that were built in April and finally the successes and failures of these nests so far as they were known.

TABLE IV.

MOURNING DOVE NESTS BUILT ON OTHERS.

Year	Number of Nests	Per cent of total nests	Number in April	Successes	Failures
1920	20	15.4	13	2	10
1921	18	15.1	12	8	4

There is a surprising uniformity in the two years in the number of nests built on top of others—fifteen per cent each year. In 1920 thirteen of these nests were found in April, one in May, four in June, and two in September, while in 1921 twelve were found in April, three in May and three in September (we were not here during the summer).

Thus two-thirds of these nests occurred in April in both years. Here again would seem to be evidence of adaptation for greater protection in early spring.* In 1921 it worked out this way for two-thirds of the nests built on others were known to have succeeded while only one-third of the others did.

* It is possible that last year's Doves like to utilize these nests of other birds for their first attempts at nest building but with increasing experience grow more independent later in the season.

But in 1920 the results are just the opposite for then only one-sixth of the nests placed on others were known to have succeeded, while the same proportion as in 1921—one-third of the others did. An explanation of this lies in the fact of most of the nests on top of others being built in April, for the fatalities in that month were far greater than later in the season, due apparently to storms. These nests were neither better nor worse off than the others.

The chief advantage of building on another nest lies in a larger, stronger place for holding the young. Apparently there was no advantage when it came to weathering a long cold rain. Of the two successful nests on top of others in 1920, one raised one bird and the other raised two, and in 1921 all eight raised their full quota, which was even *three* in one case, and of the sixteen other successful nests nine raised only one bird apiece. (However three of these half broods were not due to frailty of the nests, two eggs being infertile, and one egg being knocked to the ground by the parent as he was frightened off the nest—the only case of such injury that occurred with us.)

Thus in 1920 no advantage accrued to the Doves that built their nests on top of others, but in 1921 these nests were decidedly more successful, both as to percentages of nests succeeding and to numbers of young raised.

Sometimes a Dove's nest is used again the same season; we have noted five instances of this. In 1919 a nest on August 16 contained one young bird and on August 26 two eggs. In 1920, one brood was observed to be in possession of a nest from April 22 to May 17, and on June 5 it was again occupied; the other nest was in use May 13 and 19, but was empty May 31, on June 16 a parent was again incubating. In 1921 one nest was used throughout April and was empty May 4, on May 25 a parent was incubating. In the other, one young bird left the nest May 3 or 4, and on the 29th a parent was in possession. The natural assumption is that the nest is used again by the pair of birds that built it, but we do not know whether this is true. Dr. Whitman[2] found a decided tendency among all his pigeons to select a new site for each nest.

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[2] Loc. cit. III, p. 21.

It may be that other Doves utilize these old nests of their kind just as they do those of other birds.

Occasionally Doves make surprising choices of nests to build on: squirrel's nests are reported by two observers[3] [4] but one of the most unexpected is the use of a Baltimore Oriole's nest which was found in Kansas by Mr. A. J. Kirn.

This habit of using nests of other birds occasionally results in Doves incubating eggs of other species. Mr. F. Graham[5] reports of two Mourning Dove's eggs and three Boat-tailed Grackle's in a Grackle nest; Mr. J. R. Pemberton[6] tells of a Dove incubating two Brown Thrasher eggs as well as her own two in a Thrasher nest; while Mr. J. L. Davison[7] found a partly built Robin nest that had been finished by a Yellow-billed Cuckoo, and which contained one Robin egg, two Cuckoo eggs and two Mourning Dove eggs, the two latter birds being on the nest. What a pity this unique family was not left to develop!

Because of the Dove's method of feeding young it seems impossible that any young passerine bird that happened to hatch in a Dove nest could survive. Cowbird's eggs have been reported in Mourning Dove nests by two authors[8] [9]. We were hoping to watch developments in two nests with alien eggs this spring. The first case was a Robin's nest found April 15, with one Robin's egg in it; on April 23 a Dove was in possession and the nest contained two Dove eggs and one Robin's. On April 26 the situation was unchanged, but on the 28th, to our disappointment, the Robin's egg lay broken on the ground. The Dove's eggs hatched May 4, and the birds left May 19.

The other instance was an experiment we made by placing a Cowbird's egg, taken from a Cardinal's nest, in a Dove's nest that contained one egg on April 26. On April 30 the nest contained two Dove eggs and the Cowbird egg, but on May 4 and 5, only one Dove egg beside the Cowbird egg, and on the 9th, the nest was

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[3] Stoner, E. A. Oologist, XXXII. 1915. p. 76.

[4] Kirn A. J. In a letter. Texas, April, 1920.

[5] Oölogist, XXXII. 1915, p. 211.

[6] Condor, XXIII. 1921, p. 133.

[7] Auk, IV. 1887, p. 264.

[8] Coues, E., Auk. I. 1884, p. 293.

[9] Bendire, C., Smithsonian Rep. 1893. pp. 587–624.

empty. We hope to carry out this experiment with a Cowbird egg another year. In these two cases it looks as if the Doves did not wish to have more than two eggs in the nest as in each case one disappeared and in the case of the Robin's nest it was impossible for it to roll out. However, in two other nests found in 1921 three Dove eggs were incubated and hatched.

2. THE EGGS.

Incubation period. Dr. Witman[10] found that the time of laying of the first egg of captive Mourning Doves occurred between 4 and 6 P. M., while in six cases the second egg was laid early in the morning of the second day after from 6.30 to 9.00 A. M. The incubation period was found by him by observation on eleven sets[11] of eggs to be 14½ to 15½ days for the first egg and 14 1/8 and 14 7/8 for the second. Dr. Whitman[12] noted that in the case of all his pigeons the young birds usually hatched early in the morning or between 10 A. M. and noon. "If the egg does not hatch by 3 P. M. one can be fairly certain that nothing will be done until next morning. It may be fully time for the bird to hatch, but for some reason the hatching is not completed, and the bird *goes to sleep*, apparently rests, and then wakes up very early with the rest of the birds in the morning and concludes the hatch."

As a rule one or the other parent is continuously on the nest from the time the first egg is laid until the young are fairly well grown. Dr. Wallace Craig[13] says, "Male and female take regular turns in sitting on the eggs or young: the female sits from evening till morning, the male from morning till evening, the exchanges taking place usually about 8.30 A. M. and 4.30 P. M." As Mourning Doves will not come to their nests if they see a person any where near, I have witnessed this exchange only when I was concealed from view. On May 11, 1921, a female was relieved by her mate at 8.17 A. M., and on September 22, a male left the nest upon the return of the female at 4.25 P. M.

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[10] Loc. cit. III. p. 45.
[11] Loc. cit. III. p. 42.
[12] Loc. cit. III. p. 50.
[13] Auk, XXVIII. 1911. p. 406.

The Number of Eggs. The number of eggs in a set is almost always two, but one, three and four eggs in a nest have been reported.

Dr. Whitman's[14] Mourning Doves in two cases laid only one egg. Mr. J. G. Tyler[15] found a heavily incubated egg of this species in an old nest of a Mockingbird, "the unusual depth of the nest seeming" to preclude the possibility of an egg having rolled out. Capt. Bendire[16] and Prof. Wm. S. Taylor[17] say that "sometimes only one" is laid, while Mr. W. F. Henninger[18] says this "frequently happens."

Sets of four eggs have been reported a number of times. In five such cases[19-23] no details are given. The four found in a Yellow-billed Cuckoo's nest by Messrs L. B. and L. I. Evans[24] were all equally incubated. Mr. A. F. Ganier[25] stated that "only one pair of birds was in evidence" at his nest with "four perfectly fresh eggs." Dr. Lynds Jones[26] reported that his set of four "was pretty clearly occupied by two females amd one male." In a letter he says: "The eggs were paired both as to size and shape, and degree of incubation. Two of them (which were alike in shape and size) were well advanced in incubation, while the other two were slightly addled."

I have found reports of over 40 cases of three eggs in a nest; most of the finders give no details as to appearance or stage of incubation of the eggs. Eleven[27-37] report single cases only. Two

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[14] Loc. cit. III. p. 43.
[15] Pac. Coast Avifauna 9, 1913. p. 37.
[16] Life Histories of North American Birds, I, 1892, p. 142.
[17] The Mourning Dove. Bull. Univ. Texas, No. 57, 1916. p. 6.
[18] Wilson Bulletin, IX, 1902. p. 138.
[19] Barnes, R. M. Oölogist, XXX. 1913, p. 148.
[20] Duprey, H. F. Oölogist, XXX. 1913. p. 148.
[21] Gainer, A. F. In a letter; set found by friend at Nashville.
[22] Harris H. Birds of Kansas City Region, 1919, p. 258. Also in a letter.
[23] Shepardson, D. I. Oölogist, XXVI, 1909. p. 153.
[24] Oölogist XXXI. 1914. p. 80. Also in a letter.
[25] The Hummer. Aug. 1899.
[26] Wilson Bulletin XXXI, 1909, p 190.
[27] Barnes, R. M. Loc. cit.
[28] Beard, T. R. In a letter.
[29] Densmore, R. Oölogist, XXX. p. 16.
[30] Evermann, B. W. Auk, V. 1885; p. 351; also Proc. Ind. Acad. Sci. 1920, p. 37.
[31] Graham, F. Oölogist, XXXII. 1915, p. 211.
[32] Graves, E. W. Oölogist, XXVI, p. 56.
[33] Grinnell, J., Bryant, H. C. and Storer, T. I. Game birds of California. 1918, p. 595.
[34] Harris, H. Loc.cit. Also in a letter.

such sets are illustrated.[38-39] Three men[40-42] have found two instances of these sets, Mr. H. C. Little[43] reports "several," Mr. H. P. Attwater writes that on "two or three occasions" he has come across such sets and Mr. L. B. Evans writes that a neighbor has found two or three. Mr. Wm. S. Taylor states in a letter that he has found three such sets, while the Evans brothers have found as many as six sets in Kansas, all of these occurring in May.

Of the men who do describe their sets, only one[44] says the size and shape of the eggs were about the same. In six sets[45-48] differences in size are mentioned; in four, one egg was smaller than the others, in one it was larger, and in the other, two were smaller and one the usual size. Mr. J. G. Tyler[48] describes the third egg as "somewhat smaller, more pointed, and of a shade so unlike the others that there appeared to be a difference in shell texture."

In three cases there was a marked difference in the stage of incubation of the eggs, Mr. F. Stephens[49] reporting that in "two incubation had commenced, the third was fresh," Mr. A. S. Pearse[50] finding that two "were hardly incubated while the other was perfectly fresh" and Mr. J. W. Jacobs[51] stating that "two of the eggs were pipped" while "the third was perfectly fresh and to all appearances fertile."

We have found three nests[52] that contained more than the normal set. The first was seen May 25, 1917, when it contained two small squabs and one egg; unfortunately as we were not particularly interested in Mourning Doves at that time, we did not revisit this nest. The other two cases were found in the spring

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[38] Simmons, G. F. Auk, XXXII. 1915, p. 322.
[39] Stoner, E. A. Oölogist, XXXII. 1915, p. 76.
[40] Westbrook, D. C. Oölogist, XXX. 1913, p. 51.
[41] Hundley, C. O. 4th, Rep. Forest, Game & Fish Warden, W. Va. 1916, p. 120.
[42] Ritenbergh, J. Oölogist, XXIV. 1907, p. 9.
[43] Doolittle, E. A. Auk, XXXVI. 1919, p. 281.
[44] Hartrauft, C. W. Oölogist, XXV. p. 85–7.
[45] Jones, L. Loc. cit. Also in a letter.
[46] Oölogist, II, 1885, p. 39.
[47] Semmes, T., Jr. Oölogist, XXIV. 1907, p. 8.
[48] Evans, L. B. 3 sets; in a letter.
[49] B., W. D. L. Oölogist, VI, 1889, p. 193.
[50] Hutchinson, W. C. Oölogist, VI. 1889, p. 176.
[51] Tyler, J. G. Loc. cit. p. 36.
[52] Cited by Bendire. Loc. cit. 1892, p. 142.
[53] Wilson Bulletin, IV. 1897, p. 63.
[54] Wilson Bulletin. IV. 1897, p. 71.
[55] Nice, M. M. Condor, XXIII. 1921, pp. 145–7.

of 1921; in one, Nest 20, one egg was slightly smaller than the other two, but the three hatched just one day apart. In the other, Nest 29, the third egg looked somewhat yellowish, and it hatched five and six days after the other two. So in two of our cases there was a difference in appearance of the eggs, and in two a difference in the age.

The question arises as to whether Mourning Doves lay three and four eggs in a clutch. I think we are on safe ground in assuming that when four eggs are found in one nest they are the product of two females. Whether such cases always or usually mean polygamy we have no means of knowing at present.

As to the matter of three eggs, I asked the opinion of two men who have made a special study of the life history of pigeons, Dr. Wallace Craig and Dr. Oscar Riddle.

Dr. Craig wrote: "The question is partly a physiological one, as to whether it would be possible for a female Dove to lay three eggs in one set. As to the question of behavior, I suppose it possible that a female might lay in another's nest. Or I suppose it possible that two females might form a homosexual union, as they sometimes do in captivity."

Dr. Riddle answered my question as follows: "I very much doubt that Mourning Doves ever lay three eggs in a clutch. It seems to me probable that where three Mourning Dove eggs are found in one nest they have one of the two following origins.

"(1) The same female has laid eggs or an egg, and while incubating has again laid in the same nest. (We have a very few ring-doves who do this.)

"(2) The eggs are laid by two different Mourning Doves. If the latter happens, one conjecture would be that the same male had mated temporarily or otherwise with the two females. We have observed considerable lapses of fidelity of male doves to their mates."

Still another possibility in some cases might be the adoption of a deserted Dove's nest which contained an egg.

Before leaving the consideration of three eggs in a nest, let us turn to the cases where three young have been found. Besides our two instances, I can find four others[53-55] only one of which[55]

[53] Fisher, A. K. No. Amer. Fauna, No. 7, 1893, p. 33.

is in any way described: in this case the three young were "all of one size." Most of the finders of three eggs in a nest seem to have collected these unusual sets or not to have revisited them. Prof. Wm. S. Taylor, however, did return to those he found and in a letter he says that in each of the three cases "when I visited the nest after the birds had hatched out I found two birds, and no trace of the third egg. Each of these nests was built on the flat surface of a rail in a rail fence, the bird using a flat depression in the rail for its nest. All of these nests were in Kentucky."

In the cases we found in 1921, we were able to trace the history of the nests from the egg stage to the time the young left and at neither nest was there ever more than one pair of birds in evidence. The first of these three eggs sets (Nest 20) was found in a new Rob-n's nest on April 30; the eggs hatched May 13, 14, and 15. The birds developed rapidly so far as feather development went, but on May 19, upon weighing them, we found that the two younger were smaller than others of their age; the five-day-old weighing 21.8 grams, and the four-day-old 17 grams, the average of two other five-day-old birds being 36 grams, and of two four-day-olds 30.5 grams. It would thus appear as if the three were not getting quite enough food, yet, although we did not disturb them after May 21, they left the nest at the average age for Doves here, when 13, 13 and 12 days old respectively.

The other nest (No. 29) was a fairly substantial one in a crotch of an elm; on May 3, it contained two eggs and on May 9, three. These eggs hatched May 16, 17 and 22, on the last of which dates the birds weighed respectively 40.3 grams, 37.8 grams and 4.4 grams. The belated squab could not compete for food with its large nest-mates. The next day it had only gained four-tenths of a gram, and the day after it was dead. The others left the nest when 12 and 13 days old.

These two nests are of particular interest in that their history and outcome were different. The raising of three birds to maturity in Nest 20 was dependent on two favoring circumstances, the roominess and depth of the new Robin's nest used, and the fact

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[54] Semmes, T. Jr., Loc. cit. Two cases.

[55] Wharram, S. K. Oölogist, XXXII, p. 134.

that the birds differed only a day in age. In Nest 29, the hatching of the last bird five and six days after its nest mates made its survival impossible, as the others were eight and nine times its size, and it would be hopeless for it to expect enough food. Moreover if the three had hatched only a day apart the nest could not have held them when they were half grown. So here we have two possible explanations of the rarity of three young Mourning Doves being found in one nest: first, the ordinary Dove nest is incapable of holding three young birds to maturity, and secondly, the third bird may hatch so late that it cannot compete for nourishment with its large nest mates.

3. THE YOUNG.

Growth. There is almost always a difference in size in a pair of Mourning Dove squabs, due to their usually hatching one or two days apart. In our experience, in six nests the young hatched on succeeding days, in two nests two days apart and in another on the same day. With Dr. Whitman's[56] captive Mourning Doves one set hatched two days apart, two sets on the same day and nine on succeeding days.

In May 1921, we weighed the nestlings in one nest from the day they hatched to the age of eight and nine days, we weighed two other young for four successive days and have single weights of five other squabs of whose age we are certain. Table V. gives the weights of six young Mourning Doves. (Unfortunately these birds were not always weighed at the same time each day.)

TABLE V.

DAILY WEIGHTS IN GRAMS OF YOUNG MOURNING DOVES.

When												
Hatched	1 day	2 days	3 days	4 days	5 days	6 days	7 days	8 days	9 days	10 days	11 days
29 a	8.1	10.2	15.3	22.2	28.8	34.3	40.3	44.1	52.2	55.8		
29 b	6.2	11.5	19.0	23.5	32.2	37.8	44.4	52.1	56.3			
25 a									62.3	69.8	71.0	77.6
25 b							45.0	49.7	53.0	55.0		
48									57.7			
20 a							41.0	43.0				
Aver.	7.2	10.8	17.2	22.8	30.5	36.1	42.7	47.2	56.3	60.2	71.0	77.6
Daily Gain		3.6	6.7	5.6	7.7	5.6	6.6	4.5	9.1	3.9	10.8	6.6

[56] Loc. cit. III, p. 51.

We never weighed a young bird before it had been fed, except, perhaps in the case of the third squab in Nest 29, which weighed 4.4 grams. An infertile egg weighed 5.2 grams.

The rapid growth of these birds is apparent; 29b increasing its weight nine times by the eighth day, while the average of all the birds increased eleven times by the eleventh day.

There was considerable individual difference in the birds; 29b growing faster than 29a, so that when the former was seven days old it weighed slightly more than its eight day nest mate. On the other hand 25a was decidedly ahead of its nest mate even at the same ages. Here there was a two days difference in age and the older one apparently got more than its share of food. No. 48 was alone in the nest but did not weigh quite so much as 25a at the age of eight days. No. 20a was the oldest in a nest of three; and is slightly below average weight, but there is no marked difference as with the younger birds. No. 20b weighed only 21.8 and 26 grams at five and six days, and 20c weighed 17 grams at four days.

I kept a few notes on the most striking phases of feather development.

First hatched: covered with white down, blind.

One day old: appearance the same, but squab is larger.

Two days old: pin feathers of wings appear; eyes open a little.

Three days old: eyes open wider.

Four days old: pin feathers of tail appear.

Five days old: in two birds wing feathers have begun to unsheath, but in two birds they have not.

Six days old: wing feathers unsheathed in all four birds; tail feathers begin to unsheath in two.

Seven days old: tail feathers more or less unsheathed in all the birds.

Eight days old: pin feathers of head unsheath.

Feeding. Young Mourning Doves are fed "pigeon milk," which is regurgitated by both parents, the young putting their bills inside that of the parent. When they are small the parent feeds both at the same time, pumping the food up by a bowing motion. How long young Doves are fed after they leave the nest I do not know. A young bird we had in captivity[57] still begged franti-

[57] Nice, M. M. Proc. Okla. Acad. Sci. I. 1921, pp. 57–65.

cally from an older Dove at the age of four weeks; after this I never saw him do it. Perhaps he would have persisted longer if he had been rewarded with food instead of cruel pecks.

Position in Nest. Mr. F. C. Willard[58] says of young Mourning Doves in Arizona that they "always face in the same direction." Miss Althea Sherman[59] showed that this was not true in Iowa, the earliest date at which she reports young Doves as facing in opposite directions occurring when the oldest was six days old. Our experience has been that the more usual position is for squabs to face in the same direction, but that near the end of nest life they often face in opposite directions.

At first the young face the tail of the parent; the oldest birds in which we noted this position were eight and nine days old. Later they are more apt to face in the same direction as the parent.

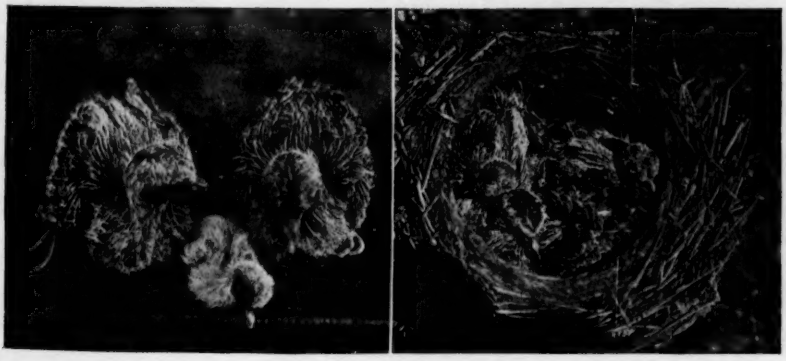
Length of time the young are brooded. Mourning Doves usually brood their young almost constantly up to the age of about ten days; after this the squabs are apt to be left alone more or less.* In 26 cases parents were seen brooding with large young and where the age was known it varied from ten to thirteen days. In five of these cases the young flew out when disturbed. Two broods were replaced, one of which was noted unbrooded in the nest two days later, but in the other three cases the birds left for good and were thus brooded till the very end of the nest life. (With such large birds, the parent usually sits beside them.) In nine of the 26 cases, the parents did not brood constantly till the very end of the nest life, and seven other broods of large young were seen with no parent on the nest.

A few cases in which the ages of the young are known will be given. Nest 25: young brooded when 10 and 12 days old; but parent not seen when young were 11 and 13 days old; young left the nest next day. Nest 29: young brooded when 10 and 11 days, but parent not seen when young were 11 and 12 days old; young left the next day. Nest 1: young brooded till 10 and 11 days old

[58] Condor, XIV. 1912, p. 59.

[59] Condor, XIV. 1912. p. 153.

* Practically all our data are based on single visits, so if we recorded a nest unbrooded or brooded at one time, it would not necessarily be true of the whole day.



1 and 2. Portions of the Mourning Dove Grove February, 1921.
3. Three young Doves from one nest, six, one and seven days old.
4. Three young Doves in old Robin's nest, eight, seven and six days old.

at least, but parents not seen when young were 13, 14 and 15 days old. Nest 118: young brooded till 4.25 P. M. by male when 8 and 9 days old; female waited in the tree one-half hour before she came to the nest; no parent seen when nest was visited, when the young were 12 to 14 days old.

The earliest age at which we have found young left unbrooded was four and five days. On September 23, 1919, in nest A the male was on the nest at 4 P. M. No parent was there at 5 P. M. although the female was near, but at 7.30 P. M. she was on. On September 27 the young were not brooded at 7.15 P. M., but at 7.45 the female was on. Another brood—V—of young that hatched on the same days as brood A, was found with no parent on or near at 5 P. M. September 23, although the female was brooding at 7.30 P. M. These two nests were exceptional as we have never found any other nestlings unbrooded for even a short while under the age of ten days, except Nest 118, for half an hour when the young were eight and nine days old. The weather was not warm; the maximum and minimum on September 23 being 73° and 53° and on the 27, 85° and 65°. And although the parents of one nest—V—showed themselves later to be indifferent to the fate of their young, those of the other proved themselves especially devoted.

Length of time the young stay in the nest. Mr. E. W. Gifford,[60] with captive Mourning Doves in California, found that two young birds in different broods left the nest at the end of twelve days. Mr. Frank L. Burns[61] gives the period of nestling life of this species, as ten to twelve days; basing his statement on his own experience in Pennsylvania and on that of Mr. C. H. Rogers in New Jersey. In contrast to these short periods, Miss Sherman[62] described a brood that did not leave till 17 and 18 days old. In answer to my question about these birds she wrote, "I have no theory why this brood staid in the nest longer than the average *here* which is at least fifteen days."

We know the ages at which 16 young Mourning Doves left the nest of their own accord in 1921.

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[60] Condor XI, 1909, p. 85.

[61] Wilson Bulletin, XXXIII, 1921, p. 96.

[62] Loc. cit.

TABLE VI.

AGE AT WHICH MOURNING DOVES LEFT THE NEST.

Nest	Date of Leaving	Number in Brood	Age in Days
1	Apr. 19 & 20	2	15
11	May 19	2	15
34	May 23 & 25	2	13
20	May 26 & 27	3	13, 13 & 12
48	May 27	1	12
25	May 28	2	12 & 14
29	May 29	2	12 & 13
118	Sept. 27	2	13 & 14

Four birds left at 15 days, two at 14, six at 13 and four at 12, making an average of 13.4 days. The average age of the 12 birds leaving after May 23, is just 13 days. The young in the two earliest nests staid longer than those later—15 days—whereas no later birds staid longer than 14 days.

Young Mourning Doves are easily frightened out prematurely. The earliest age at which we have found this to occur was eight days—the squab in Nest 48. It was replaced and left of its own accord four days later. In Nest 25 the older bird was frightened off the nest when 11 days old but was put back and did not leave permanently until it was 14 days old.

Norman, Oklahoma.

(*To be concluded*)

AN ARIZONA FEEDING TABLE.

BY FLORENCE MERRIAM BAILEY.

A FLOCK of Gambel's Sparrows with their handsome black-and-white striped crowns, spending the winter of 1920–21 like ourselves among the mesquites at the foot of the Santa Rita Mountains in southern Arizona, made a bird table seem important; for if they were kept around our tent during the winter, what other interesting migrants might they not tempt to stop in passing during the spring. They were quick to respond to our hospitality, and for five months, during which they were fed daily, made our

camp their headquarters, the younger ones with the brown-striped crowns becoming so tame that they paid little heed to us, some of them even venturing into the tent for food. While the deliberate, plaintive summer song one hears from individual Gambel's Sparrows in the mountains was rarely heard, the bright, cheery winter chorus of the flock made a delightful accompaniment to the work of the day.

The feeding table was hung in a mesquite too high to be reached by dogs and cats, and yet not too high to be seen from inside the tent when the flap was raised, just low enough in fact for photographs to be attempted from inside, by means of a long string attached to the camera standing outside focused on the table. Unfortunately, however, as the most interesting migrants came with the leaves, the filtered sunshine proved too weak for successful photography.

During the winter the ice frequently had to be broken in the water pan in the morning, and during a memorable April snowstorm the snow had to be scraped off before the food could be put out. The principal foods used were rolled oats, wheat, and mixed chicken feed—weed seed, wheat, barley, rye, kaffir corn, and cracked corn, the cracked corn proving decidedly unpopular. The other seeds were eaten not only by the Sparrows but by the Towhees and Cardinals.

The big fluffy Canyon Towhees, whose gray plumage was touched up by their brown caps, were really the first discoverers of the feeding table but, when the merry troop of Gambel's Sparrows found it and took possession of both the table and the thicket behind it, the quiet Towhees withdrew, contenting themselves with slipping in when the others were temporarily away, or with humbly picking up the crumbs which fell from the crowded table.

A pair of Arizona Cardinals, the male a superb bird, with his vivid red plumage and long nodding crest, were regular habitues of the table. At first they seemed particularly attracted by a cup-shaped section of squash rind kept filled with seed, but soon made themselves at home on the table. The actions of the timid female were an amusing contrast to those of the lordly male. For a long time she was painfully shy in the presence of the flock, usually flying off soon after they appeared, but after three months

association with them she was seen actually making a pass at a usurper.

A small water cup nailed to the tree by the table was frequented for a time by a Ruby-crowned Kinglet whose size it suited. On the tree above, pieces of suet and bacon rind attracted the black-and-white barred, brown-headed Gila Woodpeckers, perhaps the pair which had nested in the live oaks of the ranch house.

Besides the Canyon Towhee there there were two others, the common black one, and the unusual Green-tailed, both shy ground birds which came for the seeds dropped from the table and those that in acknowledgment of their earthly preferences were scattered on the ground for them. The black Spurred Towhee, which was heavily marked with white on back, wings, and tail, was seen mostly in his proper setting, scratching among the reddish brown sycamore leaves that matched his rufous sides, well shielded by a protecting tangle of grape vine. He stayed through the winter but when spring came quickly disappeared, for he did not belong among the mesquites and sycamores of our low level.

The Green-tail was first discovered with excited pleasure, feeding on the ground with a party of Gambel's. His plumage was at its best at the time, both for its delicate tones and its high lights. The unusual yellowish green of his wings and tail are always interesting but as he clambered down a bush through the sun it was a flash from his light rufous crown that identified him. As he faced us the dark gray of his throat made his white chin patch stand out astonishingly, like a great white pearl. No mistaking the one who wore that. But when this surprising bird stood quietly in the shadow of a mesquite his presence might easily pass unnoted. With dainty, timid motions of wings and tail he hopped down to scratch among the leaves, jumping and kicking back in true Towhee style. After feeding modestly on the ground all winter, toward spring he was occasionally seen on the feeding table. Once when he made his habitual run from the protecting vine thicket to the ground food dishes, finding them empty, he climbed up to the table, branch by branch. Later he flew to it from its own level, but shortly after dropped to the ground again. When I saw him, or one of his brother earth lovers, sitting up in a tree in the sun I was so amazed that I made a note of it.

As familiarity increased his confidence, our Green-tail began to show some spirit. One day as he came briskly out he calmly drove off an inoffensive Gambel's who happened to obstruct his path. And near the end of April when the striped-cheeked Lark Sparrows came and established themselves at the table, meek, timid Green-tail acted the part of Old Inhabitant. To be sure, when he first found himself near one of the self-possessed New Comers he drew back shyly as was his wont but shortly, as if reacting to its calm assurance, he actually jumped at his bird and fluttered over its head so domineeringly that the big Sparrow accepted the rebuke and flew off—for the moment. While only one of the Green-tails spent the winter with us, on March 29, he was joined by a second, and on April 10, two were on the table; while on May 3, three were in evidence. One of these had evidently met with an accident, for he was minus a tail, but he went about with a lively cheerful air as if thankful it were no worse.

Among the most regular visitors to the feeding table all through the winter and spring were the Mockingbirds, but while they found some of the food put out to their liking, the water was what attracted them the most, especially as warm weather came, when they were very thirsty. While the Sparrows and most of the other birds that came perched on the edge of the water pan and leaned down to drink, the Mockers, by reason of their long legs and larger bodies were able to stand on the table beside the pan and reach over to the water.

The Phainopeplas, or Silky Flycatchers, the crested males jet black, the females gray, were also thirsty birds. Although a few of them visited the misletoe near camp during the winter it was not until a spring contingent arrived about the middle of April that they were noticed coming for water. After that, for some time they came regularly at breakfast time and on warm days, at noon, when we could watch them from our own table under the trees a few yards away. Sometimes one after another would fly down to the pan until there were five or six drinking at the same time. A satiny black male might be squeezed in between two dull gray females or immatures. Like the female Cardinal the female Phainopeplas were sometimes shy, coming with partly flattened crests. The large, plump Mockingbirds which drank with them

were a decided contrast, looking up at us with calm confidence. They would take great draughts of water before standing erect, while the slender Phainopeplas would lean over the pan, take a sip, and raise up, their black bills wet and glistening. Sometimes we would catch the jet of a long square-cornered tail or a flash from a white wing patch as one started to fly. During dinner on April 28, we counted eleven Phainopeplas, four or five of them black males standing on the water pan or perching in the green branches above. When a crowd of birds of other kinds were on the table they would not go down to it. They would, perhaps, stop in the trees across the trail and look and crane their necks and lean toward the table, but in spite of their compelling thirst they would wait until they could have a quiet moment with those of their own kind. Once when a gray Phainopepla wanted to drink and a Cardinal was in possession of the pan, it hesitated on a twig above the water after it had started forward actually holding onto its perch with its feet until it swung head down like an acrobat. As it dropped the Cardinal made a pass at it before flying off.

When looking out at the birds from inside the tent one day I was astonished to catch sight of the strange parrot-billed Pyrrhuloxia with pink vest and long crest, on the bushes below the feeding table; but while I was gloating over the rare sight he vanished.

During the migration, watching the bird table became doubly interesting. There was no telling who would come during the day. On April 23, a familiar, faintly whistled note made me look up, and in a moment more I caught a fawn-colored, crested form and then the yellow tail band and red-wax wing tippings of the Cedar Waxwing. Three finally came to the branches just over the bird table but as their relatives the Phainopeplas and others were at the water pan they did not come down.

On April 24, when the bird table was being photographed, a meek little Inca Dove was discovered on a branch over the table and later was seen on the pan. "It drinks like a horse," was suggested, for after putting its bill in the water it kept it there, not raising it to swallow as the other birds did. When it flew down under the table to pick up seeds, its scaled plumage and long, tightly closed tail showed plainly and when it flew up the brown inner webs of its wing quills were disclosed.

On April 26, the first Lark Sparrow was found on the table. When flying to it his white tail corners showed well and when standing on the table in the sun his crown and cheek stripes shone out strikingly in formal pattern. His burred song, after the clear song of the Gambel's to which we had been listening all winter, sounded strange to our ears. A week after his arrival four were seen on the table at once. Their assurance was still affecting the nerves of the usually self-effacing Green-tail, and on more than one occasion the Old Inhabitant was seen flying at the New Comer with temper.

April 27 was a banner day at the bird table. While we were at breakfast a beautiful gray-headed, yellow-breasted McGillivray's Warbler—seen before near the ranch house—appeared for a moment on the bird table. Later when a Green-tail was on the water pan, a big Cassin's Flycatcher flew in and perching on a twig above looked down at the water, his white chin patch showing well against his dark throat. He evidently wanted to go down to drink but he was big and awkward. Finally, however, he managed to get himself down to the edge of the pan and leaned over, drinking with satisfaction. He stayed there until a Canyon Towhee came along when, perhaps not knowing its gentle spirit, he flew away. Then, much to my surprise, a Long-tailed Chat, always a handsome bird with his deep yellow breast, cool olive back, and clear white eye-markings, appeared on the scene. For a week the shy, secretive visitor stayed about camp, coming out of the grape vine thicket to get food and water, when, strange to say, he showed no hesitation about driving off the Sparrows which he found in his way. Day after day, much to my amusement he returned to a pan on the ground to get a taste of raspberry jam, apparently enjoying sugar as much as the Crossbills do salt. Later a pair of the big, distinguished looking White-winged Doves drifted up from the ranch-house oaks to the bird table and after picking up a little food jumped up on the water pan and walked along its rim showing their pretty pink feet. On that same eventful day two other birds were seen on the fragrant yellow-tasselled mesquite over the bird table. One, the black-capped, yellow Pileolated Warbler, who looked down jauntily at the table in passing; the other, the large dull-red and brown-cheeked Hepatic

Tanager. Below him two Gambel's Sparrows and two Phainopeplas were on the pan drinking and while we looked a Mockingbird flew in. What did they find to attract them? He flew closer and closer to the table and turned with a deliberate air as if to judge for himself, but failing to find either insects or berries, flew off.

Another of the birds which apparently came to the mesquite to see what was the attraction and went away without testing the fare was the Arizona Hooded Oriole, from the sycamore tree over the tent. Probably juicy insects and ocotillo syrup had already quenched his thirst.

On April 28, a female Black-headed Grosbeak was seen above the table, and on May 3, a male, but just as we were looking for him to go to the table something startled all the birds and he rose with the flock.

May 1 brought two surprises. First, when I looked up, a dainty blue-headed Lazuli Bunting stood perched over the table. Hardly had I had time to recover from my surprise and congratulate myself on seeing my little California friend again, however, when he disappeared. Then to my astonishment, on a tree across the trail from the table thare appeared a bird I had never seen—a large black, red-eyed Bronzed Cowbird. Instead of looking wistfully across at the food and inching over timidly a little at a time as most of the birds did on their first arrival, he calmly flew across and fell to, drinking his fill and eating as if famished. His meal over, he flew down to the ground and for a few moments paraded around in the sun, where his large bill, bluish iridescent wings, bronzy neck, and theatrical red eyes showed strikingly; after which he left as suddenly as he had come, to be seen no more. Fearless, self-confident, he had taken what he wanted without question, in characteristic Cowbird manner. What a positive character! I could not get him out of my mind.

That morning when we had been breakfasting a bright red Cooper's Tanager had appeared on the bird table. Before we could more than exclaim at his brightness—such a contrast to the dullness of the Hepatic seen there before—he was gone. But during the afternoon he returned and drank from the water pan.

On May 2, a bird which may have spent the winter in the neighborhood appeared in the flock of Gambel's Sparrows, a White-

crowned Sparrow, distinguished from his confreres by the small but important mark, the black spot between his bill and eye.

One of the Gambel's Sparrows gave me a surprise that day by taking a bath in the water pan. He was the first bird I had seen all winter presuming to use water for that profane purpose. For in that year of drought in the desert both bird and beast were fortunate indeed if they could get enough to drink. The bath was doubtless accounted for by the fact that *gambeli* is a bird of lush mountain meadows threaded with running brooks. Certainly no right-minded desert bird would have been guilty of such shocking wastefulness.

The following day to my great satisfaction the third and last of the Tanagers to be looked for here appeared over the bird table —the red-headed, yellow-and-black Louisiana. For some time in the characteristic deliberate Tanager way he looked down at the table as if trying to fathom the strange phenomenon, but at last dropped down to the water pan.

The next three days we were so busy breaking camp that we had no time for the bird table. But although we left the mountains without seeing the last birds the migration should have brought us, I had seen enough to leave with a lively sense of the keen interest and pleasure afforded by a camp feeding table.

Of course many migrants, especially Warblers, Vireos, Flycatchers, and Hummingbirds passed through the neighborhood, many of them through camp, without visiting the bird table; but that is another story.

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A VISIT TO MIDWAY ISLAND.

BY PAUL BARTSCH.

THE little paper here presented was prepared as we left Midway Island in 1907, it being my intention to send it to 'The Auk' from Guam. The manuscript was lost, and has only recently again come to hand. Believing that the data contained in it have sufficient value to merit publication I submit it even at this late date.

On the night of November 6, we sailed under half steam that we might reach Midway at dawn. In the first dim light of the following morning we sighted the islands as a faint mist on the horizon, and shortly after came close enough to see the surf pounding the narrow barrier reef that encloses the lagoon and the two islands. Midway is situated in Latitude 28° 12′ 22″ N., Longitude 177° 22′ 20″ W., about 1,000 miles west by north from Honolulu. The encircling reef forms an almost complete fringe, its chief interruption being to the northwest, where there is a channel of sufficient depth to admit a steamer in fair weather. Were the ring complete it would measure about eighteen miles. The two low sand islands are both near the southern end of the lagoon.

As soon as the necessary formalities had been discharged, Mr. Wells and I left the "Albatross" for the islands. We touched on Sand Island, which contains the telegraph station, and the barracks, to secure information how best to approach Eastern Island, then set out for it. The space between the two, a little more than a mile and a half, is shallow, showing a bottom thickly studded with heads of coral which come close to the surface and make rowing rather difficult when the sea is choppy. We spent all of November 7 on Eastern Island, which is a low pile of more or less consolidated coral and shell sand, of roughly triangular outline. The southern edge is almost a mile long and separated from the reef by a channel about an eighth of a mile in width. Its length from north to south is about three quarters of a mile, and the entire island excepting the beach is covered by a scanty growth of Scaevola bushes, grass and sedge, the ground itself being literally honeycombed by the nesting burrows of the wedge-tailed petrel.

On November 8, we visited Sand Island, which is boot shaped, with the leg of the boot a little wider than the conventional concept, the toe pointing in a south westerly direction and the front and back of the leg north and south. Its greatest north and south line is a little more than a mile, while its greatest east and west is a little more than three quarters of a mile wide. Sand Island is much more elevated than Eastern Islands. Its highest point, which is in the middle of the northern line at some little distance from shore, is forty-three feet and this place is occupied by the cable station and the marine barracks. This end of the island is

a bleak, barren waste of white sand, very trying and tiring to the eyes. The southern edge of the island consists of a series of sand dunes covered with Scaevola bushes, of which there is quite a thicket on the southwestern part. In the interior the dunes are more scattered and the vegetation is less developed.

Midway has been visited twice before by ornithologists. In 1891 Mr. Henry Palmer, while making collections for Rothschild, spent a week here, July 11–17, a journal account of which is published in Rothschild's 'Avifauna of Laysan,' pp. xiii–xiv, 1893–1900. He records fourteen species:

Megalopterus minutus melanogenys (Gray)
Gygis alba candida (Gmelin)
Diomedea immutabilis Rothschild
Diomedea nigripes Audubon
Puffinus cuneatus Salvin
Phaethon rubricaudus Boddaert
Fregata minor palmerstoni Gmelin
Sula leucogastra (Boddaert)
Sula dactylatra personata Gould
Sula piscator (Linnaeus)
Heteroscelus incanus (Gmelin)
Phaeopus tahitiensis (Gmelin)
Porzanula palmeri Frohawk
Telespiza cantans Wilson

The second visit was made by Mr. William Alanson Bryan, then of the Bishop Museum, Honolulu, who spent a day and a half here on August 21 and 22 in 1902. He has published on this visit in 'A report on a visit to Midway Island' in the Occasional Papers of the Bishop Museum, August 26, 1905, pp. 37–45. In this paper the following species were listed:

Sterna fuscata oahuensis Bloxham
Anous stolidus pileatus (Scopoli)
Megalopterus minutus melanogenys (Gray)
Gygis alba candida (Gmelin)
Diomedea immutabilis Rothschild
Diomedea nigripes Audubon
Puffinus cuneatus Salvin
Phaethon rubricaudus Boddaert
Fregata minor palmerstoni Gmelin
Sula dactylatra personata Gould
Sula piscator (Linnaeus)

Phaeopus tahitiensis (Gmelin)
Arenaria interpres oahuensis Bloxham
Porzanula palmeri Frohawk

During our short visit we noted all the species recorded by these two observers, with one exception; namely, *Sula leucogastra*, but we also observed five additional species not recorded by them.

I am indebted to Dr. Richmond and Mr. Riley of the Division of Birds U. S. National Museum, for the latest dictum in the scientific names used in this paper.

Sterna fuscata oahuensis Bloxham. HAWAIIAN SOOTY TERN.—Several groups of Sooty Terns were seen on the beach at Eastern Island and scattered individuals in and among shrubbery of the interior. All in all, we probably saw two hundred living individuals. Among the bushes, however, a large number of dead, both youg and old, were found in various stages of decomposition. On Sand Island the conditions were still worse. Less than a dozen living individuals were here noted while hundreds of dead bodies were strewn among the Scaevola bushes bordering the southwestern shore. Here, too, the dead seen were fledged young and adults. It would seem as if some epidemic had invaded this colony and almost overwhelmed it.

Anous stolidus pileatus (Scopoli). PILEATED NODDY TERN.—Quite rare on both islands. Not more than a dozen specimens were seen flying about Eastern Island and a single individual only was noted on Sand Island.

Megalopterus minutus melanogenys (Gray). HAWAIIAN TERN.—Very rare—Only a single living individual, which we photographed, was seen sitting under some low bushes. It was exceedingly tame, so much so that I believed it to be sick. A number of dead specimens were found among the dead Sooty Terns on Eastern and Sand Islands.

Gygis alba candida (Gmelin). HAWAIIAN WHITE TERN.—This exquisite little bird was found on both islands. It is more abundant on Eastern, where we saw probably two dozen specimens. This bird is as fearless as it is beautiful, hovering over the intruder's head almost within reach of his hand, alighting in the nearby shrub when you come to a stop, watching you the while with inquisitive eyes. Birds of this type make collecting difficult, not because they are hard to obtain, but on account of their confiding nature. None were taken.

Diomedea immutabilis Rothschild. LAYSAN ALBATROSS.—These birds mingled with the Black-footed Albatross and averaged about one to twenty of the latter. They seemed to be more partial to that portion covered by vegetation than the sand dunes, though some were also found in open places. In a number of instances two birds were found together, apparently paired, rehearsing their curious love ceremonies. One individual, caught and held for a moment, offered his dinner as a ransom. The

contribution consisted of a mass of Scaevola berries and several large pebbles. Their fearlessness made photographing them a very simple performance.

Diomedea nigripes Audubon. BLACK-FOOTED ALBATROSS.—I was told by the inhabitants of the station that these birds are now beginning to return to their breeding ground, and that a little later there would be a hundred on Midway to each one now present.

Although these birds were within sight of our ship ever since we left San Francisco, I little appreciated their stately proportions until I met them here on shore. On wing they look so trim—not at all bulky, as they do when on land. Their flight when a good breeze is whipping white caps on the sea reminds one of gigantic Chimney Swifts, but when the wind is low they are less active and might then even be called awkward flyers.

As we landed our boat on Eastern Island a sudden shower of short duration forced us to seek shelter under the Scaevola bushes on shore. These being insufficient to protect us from the driving rain and cold, we finally buried ourselves in the sand and thus succeeded in hushing the tattoo of our chattering teeth. While here, inquisitive Albatrosses formed a circle about us. We also excited the curiosity of the only mammalian representatives on the islands, eight burros, which joined the circle of clamoring birds and gazed with wondering eyes, outstretched necks and protracted ears at the curious, to them apparently bodiless heads resting on the sand. I regretted much not being able to secure a photograph showing the combination of Albatross and ass. I was told that two of the officers at the station had imported a pair of these asses to be used for riding about Sand Island, but finding them too destructive, they transported them to Eastern Island and turned them loose. Here they have multiplied to the number of eight and seem to be in good condition. They are of the tall, exceedingly long-eared, shaggy-coated variety and would have proved interesting objects to the student of the effect of environment upon mammals. The question of their water supply interested me, and I was told that they pawed in the sand at some little distance from shore until water was exposed, which they drank. I understand that the entire "assinine" population, consisting of twenty-two specimens, was killed in 1912 or 1913 to stop their destruction of the homes of the burrowing birds by breaking through the shallow roof of their tunnels.

Most of the birds were in groups on Eastern, and the open sandy portion of Sand Island. Some of the groups must have contained a hundred birds or more. They were evidently mating, for they were going through their curious song and dance ceremonies. These performances were participated in at times by single pairs, at other times by large groups. Smaller groups and single pairs were scattered all through the island and one pair was seen engaged in copulation, which would speak for a breeding season close at hand.

On Sand Island we saw heaps of bleached bones of Albatrosses, a reminder of a visit to this island by Japanese plume hunters, who are said to have made regular trips to this and neighboring isolated islands for skins and feathers.

Puffinus cuneatus Salvin. WEDGE-TAILED SHEARWATER.—This species at the present time is a close second as far as numbers are concerned, to the flightless rail on Eastern Island. All the elevated portions of the island were thoroughly honeycombed by their nesting burrows, and these rendered walking rather difficult in many places. The burrows are only a short distance below the surface, leaving the upper arch too weak to support the weight of a man. We found ever so many young birds all seated outside, near the entrance to the burrows. Some of these were still in their dusky, downy plumage, while others had attained the garb of the parents. Many of the old birds were seen flying about and occasionally one would drop near its nestling.

For several nights prior to our reaching Midway, specimens of this species came aboard our boat. On the last night no less than three were caught.

Oceanodroma castro (Harcourt). HAWAIIAN PETREL.—Three specimens of this species came aboard while we were at anchor within the encircling barrier of coral reef at Midway.

Oceanodroma tristrami Stejneger. TRISTRAM'S FORKED-TAILED PETREL.—A specimen of this species came aboard the "Albatross" on the night previous to our arrival at Midway, November 6, at Latitude 28° 15′ N., Longitude 176° 30′ W. Since this is but a short distance from the islands I have thought it best to include it in the list.

Pterodroma hypoleuca (Salvin). BONIN ISLAND PETREL.—A Petrel not quite so large as the Wedge-tailed Shearwater was seen flying about Eastern Island in company with the above named species. It appeared to have a smaller bill, and had white and black areas on the sides of the head. It is an extermely rapid flyer and exceedingly difficult to bag. Several specimens hard hit flew out to sea and none were secured.

Phaëthon rubricaudus Boddaert. RED-TAILED TROPIC BIRD.—Found on both islands, but as in the case of all the other species, more abundant on Eastern. Here we found a number of almost fledged young birds scattered irregularly on the ground under the low bushes, each in a small, clear, clean spot, cackling and hissing and mad as the proverbial wet hen on account of our intrusion. These birds, while fully the size of the adults, did not have the long tail feathers. Quite a number of birds were seen on wing, some flying overhead and following us about the island, others fishing out at sea. It was a pleasing sight to see them plunge into the water like a rocket from a great height, disappearing completely below the surface. Most of the birds on wing possessed the long tail feather.

Fregata minor palmerstoni Gmelin. MAN-O'-WAR BIRD.—Man-o'-war-birds could be seen at all times high above the islands, hanging in

the air on motionless wings. A few were found sitting on bushes near the middle of Eastern Island.

Sula leucogastra (Boddaert). BOOBY.—Found breeding on Midway Island by Palmer, July 14.

Sula dactylatra personata Gould. BLUE-FACED BOOBY.—A few of these birds were seen flying about both Islands.

Sula piscator (Linnaeus). RED-FOOTED BOOBY.—Three individuals of this species were found seated in the dry sandy plain on the middle of Sand Island in company with the Black-footed Albatrosses, Curlews and Golden Plovers.

Porzanula palmeri Frohawk. LAYSAN ISLAND RAIL.—Mr. Henry Palmer states in his diary published by Rothschild in 'The Avifauna of Laysan,' page xiv, that Captain Walker's son liberated on this island a pair of Laysan Island Rails. They must have found the conditions very suitable for them here, for they are certainly very abundant now. The little fellows remind one more of mice than birds as they scurry away from under your feet and dodge your hand when you try to catch them. They are exceedingly quick and expert at dodging, so much so that we found it next to impossible to catch one, even when in so small a piece of brush as two feet square. One little fellow, whom we had chased into rather open ground, sought safety by diving into a Petrel burrow where we caught him. After examining him we set him free. This experience did not frighten him very much, for after running a short distance into a clump of shrubbery, he crept cautiously forth, eyeing us curiously, undoubtedly wondering about the meaning of the whole affair. If one sat quietly in any place in the shrubbery on this island, one or more of these birds would come up to within reach. A move on your part would make them retreat just beyond your reach but never any distance. This little Rail is at the present time probably the most abundant bird on Eastern Island.

Pisobia acuminata (Horsfield). SHARP-TAILED SANDPIPER.—Two specimens of this species were secured on Sand Island, where several others were seen. They frequent the open sandy stretches between the Scaevola bushes and in their habits recall our Pectoral Sandpiper.

Phaeopus tahitiensis (Gmelin). BRISTLE-THIGHED CURLEW.—Quite abundant on both islands, where in company with the Golden Plover it frequents all parts of the island excepting those covered by brush. These birds were quite tame as well as curious and when flushed would frequently fly about us, emitting their peculiar cry. Specimens shot were in excellent physical conditions and crammed full of Scaevola berries. The flesh was delicious and quite free from the usual fishy taste, which was probably due to their diet.

Pluvialis dominicus fulvus (Gmelin). PACIFIC GOLDEN PLOVER.—Four specimens of this species were secured. They were quite abundant on both islands, frequenting the grassy plots and the open sandy places, in fact all parts but those covered by Scaevola bushes.

Arenaria interpres oahuensis Bloxham. PACIFIC TURNSTONE.—Abundant on both islands, everywhere. It was a decided surprise to us to find waders in bushes feeding upon berries, and yet this was the case here. Again and again we flushed bunches of Turnstones from the dense Scaevola thickets and watched them circle about for some time, only to re-alight in the tops of another clump of bushes. Specimens shot on Sand Island were filled with Scaevola berries. On Eastern Island we saw them running on the beaches following the waves and feeding in the orthodox manner.

Asio flammeus sandwichensis (Bloxham). SHORT-EARED OWL.—A single specimen was flushed from a Scaevola covered sand dune on Sand Island. We marked the place where it alighted near the middle of the western shore, but the bird was very wild and left long before we came within gun-range, flying far out to sea before swinging to the southern point of the island. A further attempt to add it to our bag proved equally unsuccessful.

Telespiza cantans Scott Wilson. YELLOW FINCH.—I was told by Mrs. Florence McDerfee Nevin, the wife of Lieut. J. D. Nevin, who was in command of the Marine detachment at Midway at the time of our visit, that the birds locally called Canaries were brought to Midway from Laysan Island. They are not very abundant; we saw only three small flocks, probably twenty-five specimens in all, on Eastern Island, where they frequent the shrubbery. Like most of the other birds of the islands they are exceedingly tame and curious; rather sluggish in their movements and quite stupid. The only note heard was a half subdued squeak. They appear to be equally at home on the ground and in the shrubbery. Mr. H. Palmer says in Rothschild's 'Avifauna of Laysan' that Capt. Walker's son liberated a Finch on the island. It would be very interesting to get definite data of subsequent importations which made the present colony possible, for Palmer does not list it as a resident on Midway.

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THE FALL MIGRATION OF HAWKS AS OBSERVED AT FISHERS ISLAND, N. Y.

BY A. L. FERGUSON AND H. L. FERGUSON

FISHERS ISLAND, N. Y., lying as it does at the eastern entrance of Long Island Sound, is a connecting link between Rhode Island and Long Island, N. Y., and with the other two islands, Gull and Plum, affords stopping places for birds of all kinds on their migration southward each fall.

Thirteen species of hawks have been collected on the Island though only six are classed as "common" by us. By far the most common is the Sharp-shinned Hawk, and then, according to numbers come the Pigeon Hawk, Marsh Hawk, Sparrow Hawk, Osprey, Duck Hawk, Cooper's Hawk, Red-tailed Hawk, Red-shouldered Hawk, Rough-legged Hawk, Broad-winged Hawk, Goshawk, and one record of a Gyrfalcon. The last was shot October 10, 1915, and identified by Dr. F. M. Chapman, as *Falco obsoletus*. This is the only record of this bird from the Island. The Buteos rarely come over Fishers Island, and at the most, it would be safe to say that not more than ten of each kind are seen in any year. Possibly the instinct of these hawks keeps them over wooded countries, but why they should like a different route from the Sharp-shinned Hawk, which is a wood-loving bird also, is difficult to figure out. Owing to their small numbers, the Buteos, Cooper's Hawk, and the Goshawk are classed as rare birds with us at the Island, and only notes on what we feel were remarkable flights of Sharp-shinned Hawks, Marsh Hawks, Pigeon Hawks, and Duck Hawks are given separately.

When the migrating instinct grows strong enough to call them southward, the hawks come in great waves. Whether or not weather conditions affect all birds we do not know, but it is a certainty that the necessary weather conditions must exist in order for a large flight of hawks to come over Fishers Island. If conditions are not suitable, the flight does not come, though occasional hawks may be observed, but when the conditions are right, they fly in great numbers. As a general rule we get several flights each fall. The first about September 13; the second about September 20, which has always been the main flight; and the last flight, which is much smaller, near the end of September, or early in October.

The favorable conditions for a flight follow, but it must be borne in mind, that a flight day is chiefly a Sharp-shinned flight, though many Marsh Hawks and others are seen; thus making the large total. On any date after September 5, if a decided change of weather occurs, and is followed by a clear, bright day with a north-west wind and large white clouds, we invariably get a flight. That the wind plays the most important part we know from our

records. On some days we have had the flight commence early in the morning, only to have it stop completely when the wind changed from north-west to north or north-east. For the last six years we have made notes of the hawks passing over Fishers Island, and have found that with only a few exceptions the flight has come when the wind was from the northwest. The days when these exceptions occurred the surface wind was northeast, and the hawks were flying at a great height, and at a level where we believe the winds were moving from the northwest, though this could not be determined, as there were no clouds. This belief in a northwest wind being necessary for a flight was studied by the late Prof. C. C. Trowbridge, who published his observations in 'The American Naturalist.' From our own observations we agree with him, for we had reached the same conclusion before he sent us his article in 1918. In his article were given tables showing the wind and weather conditions on flight days, and as similar tables may be of interest we give below tables showing the weather conditions, kindly furnished by the Weather Bureau at Providence, lying to the north of Fishers Island, together with the local conditions at the Island, with notes on each day's flight.

Date	Wind at Fishers Island	Wind at Providence R. I.	Character of day	Temperature change last 24 hours	Notes
Sept. 16/16	N. W.	N. W.	Pt. Cloudy	—12°	Small flight of Sharp-shinned and Marsh Hawks.
Sept. 19/16		N. W.	Clear	— 2°	Small flight of Sharp-shinned, Marsh, and Pigeon Hawks.
Sept. 25/16		N. W.	Pt. Cloudy	— 4°	Small flight of Sharp-shinned, Marsh and Pigeon Hawks.
Sept. 26/16		W.	Clear	+ 1°	Slightly larger flight of mixed hawks.
Sept. 30/16		N. W.	Clear	—15°	Large flight of mixed hawks.
Oct. 1/16		N.	Clear	— 3°	Small fight of mixed hawks.
Sept. 10 17		N. W.	Pt. Cloudy	— 8°	Few Marsh, Sharp-shinned, and Pigeon Hawks.
Sept. 11/17		N. W.	Clear	0°	Small flight of Marsh and Sharp-shinned Hawks.
Sept. 18/17		N.W.	Pt. Cloudy	+10°	Small flight of Marsh and Sharp-shinned Hawks.

Sept. 22/17		N. W. & N	Clear	—13°		Good flight Marsh, Sharp-shinned, and Pigeon Hawks and a few Cooper's Hawks.
Oct. 4/17		S. W.	Cloudy	+ 4°	4	Duck Hawks shot. Some Pigeon Hawks.
Oct. 8/17		S. W.	Pt. Cloudy	+6°	2	Duck Hawks shot. Few Pigeon Hawks seen.
Sept. 7/18	N. W.	N. W.	Pt. Cloudy	—10°		Small mixed flight.
Sept. 9/18	N. E.	N.	Cloudy	+2°		Good flight, Birds very high, 269 hawks seen.
Sept. 11/18	N. E.	E.	Clear	—12°		Good flight, Birds very high, 351 hawks seen.
Sept. 22/18	N. W.	N. W.	Cloudy	—11°		Small mixed flight.
Sept. 22/18	N. W.	N. W.	Clear	— 2°		Large mixed flight.
Sept. 23/18	N. W.	W.	Pt. Cloudy	+ 4°		Flight diminishing.
Sept. 30 18		N. W.	Clear	— 5°		Small Pigeon Hawk flight.
Oct. 1/18		N. W.	Clear	0°		Small mixed flight.
Oct. 14/18		N. W.	Clear	—11°		Small Pigeon Hawk flight. A few of other species seen.
Sept. 12/19	N. W.	N. W.	Pt. Cloudy	+ 1°		Small flight of Sharp-shinned, and Pigeon Hawks.
Sept. 13/19	N. W.	N. W.	Clear	— 1°		Fairly large mixed flight.
Sept. 14/19	N. W.	N. W.	Pt. Cloudy	+ 1°		Flight diminishing.
Sept. 17/19	N. W.	N. W.	Pt. Cloudy	+ 5°		Large mixed flight, many Sharp-shinned and Pigeon Hawks.
Sept. 18/19	N. W.	N. W.	Clear	— 6°		Very large flight, mostly Sharp-shinned Hawks.
Sept. 26/19	N. W.	N. W.	Clear	— 8°		Fairly large mixed flight.
Sept. 2/20	N. W.	N. W.	Clear	— 6°		Small flight of Marsh, Pigeon and Sharp-shinned Hawks.
Sept. 3/20	N. W.	N. W.	Clear	+ 4°		Small flight of Marsh, Pigeon and Sharp-shinned Hawks.
Sept. 4/20	N. W.	N. W.	Clear	+ 2°		Small flight of Marsh Pigeon and Sharp-shinned Hawks.
Sept. 9/20	N. W.	N. W.	Clear	+ 2°		Increasing number of Sharp-shinned Hawks.
Sept. 13/20	N. W.	N. W.	Pt. Cloudy	+ 2°		Small Pigeon Hawk flight, others mixed in.
Sept. 14/20	N. W.	N. W.	Cloudy	— 7°		Increasing number Sharp-shinned, Pigeon and Marsh Hawks.
Sept. 17/20	N. W.	N. W.	Clear	— 3°		Small Pigeon Hawk flight.

Sept. 19/20	N. W.	N. W.	Clear	—13°	Very large Sharp-shinned Hawk flight. 2000 Hawks estimated.
Sept. 20/20	N. W.	N. W.	Pt. Cloudy	— 1°	Large flight but diminishing.
Sept. 21/20		S.	Pt. Cloudy	+ 5°	Very large flight of Marsh and Sharp-shinned Hawks.
Sept. 26/20	S. W.	W.	Clear	+ 2°	Small Pigeon Hawk flight.
Sept. 28/20	S. W.	S.	Cloudy	— 3°	Large Pigeon Hawk. flight.
Oct. 4/20	S. W.	S. W.	Clear	+ 4°	12 Duck Hawks seen. Also a few Marsh and Pigeon Hawks
Oct. 5/20	N. W.	N. W.	Pt. Cloudy	—10°	3 Duck Hawks shot. A good many Pigeon and Sharp-shinned Hawks.
Oct. 6/20	N. W. & N. E.	N. W.	Pt. Cloudy	0°	Large flight of Sharp-shinned Hawks over by 9.30 A. M.

From the above it will be seen that of the 42 flights noted,—

31 of these were on a N. W. wind
23 of these were on a falling temperature
22 of these were on clear days
15 of these were on partly cloudy days.
5 of these were on cloudy days.

It is evident from the tables that the hawks are retarded on their flight by adverse winds. They gradually drift south until they reach the ocean's edge, and when the weather becomes favorable again, start on their south-westerly flight. That the northwest wind aids, is due to the wind helping to raise the bird, and making flying easier. This is readily seen along a mountain range when the hawks are seen to be flying, in most cases, on the windward side. The reason for this is that the winds striking the mountain side are deflected upward, which exerts pressure from below and makes flying much easier. Hawks, when flying with a favorable wind, travel much more regularly, and do not stop to circle in order to gain elevation, as is noted on days when the wind is not suitable. When the wind is not favorable, wind currents are found at certain spots, and hawks, reaching these points, will commence to circle around, gaining elevation at each turn, until they reach the desired level where the wind is suited to them, and then again they take their desired course.

The Sharp-shinned Hawks, as stated, come in great numbers and when migrating do not pay much attention to what is before them, but keep on their general course, regardless of anything that would ordinarily frighten them. If a decoy owl is used, they will change their course at times, and fly near it, but will seldom make more than one dart at it. How little attention they pay to people, was learned one day when at least eight or ten in our party were having lunch, for the Sharp-shins continued flying by, over and past us, though we had no owl up, and were plainly in view. The Sharp-shins are affected more than any of the hawks by weather conditions, and to get a great flight the day must be just right in every respect. The young birds are the first to come, and late in the flight season the adults are met with. It is most interesting to watch a good flight. Some birds will be high up, sailing straight along, keeping up their momentum with occasional beats of their wings. Others will be flying close to the ground, taking advantage of hollows and hillsides, to get the most favorable wind currents, while others may be seen darting through the patches of woods, hunting for small birds.

The Sharp-shinned Hawk, with his light build, rounded wings and long tail, finds that flying is easier when he is headed a little to the west of the northwest wind, which helps to support him and allows him to slide along slightly sideways on his desired course. During this past September, 1921, we had no Sharp-shin flight. At the general time for a flight,—September 10, to September 25,—we did not have a single day when the wind was favorable; in fact for the entire month the weather conditions were adverse. On a few mornings the wind appeared to be from the northwest, but would soon veer to the north and east. Not until October 6, did the correct conditions occur, but most of the Sharp-shins had by that time drifted along the Connecticut shore.

The Pigeon Hawk is very common at the Island during migration. These small falcons prefer a southwest wind to fly on, though numbers come along on a northwest wind. They feed early in the day, and rarely is one collected that is not found to be packed full of birds. They are very savage, and are ready to fight at any time, either with another Pigeon Hawk or a decoy owl. At the decoy we have seen one return seven times, dashing

in and squealing, but never striking. They decoy better than the Sharp-shins, and when once near the owl are not afraid of a person. The young birds migrate first, and the adults later, like the Sharp-shinned Hawk. Like their big relation, the Duck Hawk, they are compactly built and feathered and have not the feeling of a Sharp-shin, which seems loose and fluffy when handled. They are strong fliers, and do not hesitate to move along even if the wind is strong and directly against them.

The Marsh Hawk commences his southward flight about August first, and some come along nearly every day regardless of weather. Of all the hawks, these are the shyest and most suspicious, and a person must be well concealed if he wishes them to come close, as they see a man nearly as soon as a Crow would, and fly off. These hawks are not fast fliers compared with some other species. While hunting they sail about the open fields and patches of bayberry, until they come across something to their fancy, when they pounce upon it. We have seen them coursing over open fields where many pheasants were feeding, and apparently paying no attention to them. At other times they have suddenly glided over the field and made a kill of a nearly fullgrown English Pheasant. At the decoy owl they at times dash in with feet out, and strike, giving a low squeal, but seldom return again. The adult birds, as with the Sharp-Shinned and Pigeon Hawk, are the last to come.

Of all the hawks, the Duck Hawk, similar to the Peregrine Falcon of Europe, is the most interesting species we see at the Island. Nowhere is it common, though widely distributed, but a number visit us each fall. A few come on the regular flight days, but, like the Pigeon Hawks, they prefer a southwest wind to any other. A strong wind is no hindrance to them, and we have come to feel that a typical Duck Hawk day is one when the wind is blowing from the south-west, with almost a hint of bad weather. When the decoy owl is seen by a Duck Hawk, it at once flashes up to the attack, but after the first dash usually goes on its way. At the nesting time, however, the attack will be kept up for a long time, and we have had a female continue to strike even after the decoy was headless, and all resemblance to an owl was lost. The adults come mixed in with the immature birds during the migration,

but late in the season adults are still seen after the last of the young have gone by.

It is a recognized fact that the Duck Hawks are killers, but they are such wonderful fliers and make such a fine appearance that it is a great pleasure to watch them. Only this fall a cock Pheasant came flying nearly over us, and close in pursuit came a large female Duck Hawk, gaining rapidly. Seeing us, she veered off, and the Pheasant escaped into the brush. It is not to be wondered that this bird with its speed, strength and courage, was such a favorite in the days of falconry.

The little Sparrow Hawk is a courageous fighter and comes back time after time with his "Killy-Killy" call, to dash in on the decoy owl, but at the last moment veers off and never strikes. Five of these hawks have been seen about the owl at one time, and with their darting in and out, and squealing, afford an interesting study. While they take a few birds, they prefer insects, and are "good hawks."

The Ospreys while breeding in great numbers on Gardiners Island, about twelve miles to the westward, and also along the Connecticut shore, notably near Niantic, have not been known to breed on Fishers Island since 1890. Just why this is so is hard to explain, as they are never molested, and have good fishing grounds in every direction. They begin to migrate about September 1, and come in numbers, and we have seen one as late as November 22, but this must have been a straggler. At the decoy owl they often strike and squeal, and would damage it if not frightened away, for they return often to the attack.

At the request of the U. S. Biological Survey, we collected the stomachs and crops of the Sharp-shinned, Pigeon and Marsh Hawks for several years, and give below a table showing the contents. It will be found interesting, especially the report on the Marsh Hawk, which shows that whatever he does at other times, he is a killer of birds during the migration.

MARSH HAWK	SHARP-SHINNED HAWK	PIGEON HAWK
119 Stomachs sent	483 Stomachs sent	298 Stomachs sent
107 Birds	530 Birds	318 Birds
52 Mammals	16 Mammals	4 Mammals
2 Amphibians	38 Insects	967 Insects
8 Insects		
1 Fish		
11 Reptiles		

So few of the adult Pigeon, Sharp-shinned and Marsh Hawks do we see in comparison with the numbers of young birds, that we have come to the conclusion that the majority of the adults must follow a different course. Certainly we never see more than one adult for every ten young birds. In the spring we see scarcely any hawks, so it is evident they have different routes which they follow as they work their way back to their nesting localities.

Fishers Island, N. Y.

ADDITIONAL DATA REGARDING THE FAMOUS ARNOLD ARBORETUM MOCKINGBIRD.

BY CHARLES L. WHITTLE.

IN the 1921, July–August issue of 'Bird-Lore,' there is a short article by C. H. Early, entitled 'The Mockingbird of the Arnold Arboretum,' pp. 179–181 inc.; and in Vol. XXXVIII of 'The Auk' (1921) there is an exhaustive account of the Mockingbirds that have been recorded in New England and Canada, by Horace W. Wright, pp. 382–432 inc. In this article Mr. Wright deals at length with the history and imitative abilities of the same Mocker, a male, of which Mr. Early wrote in 'Bird Lore,' and commonly refers to him as the "Resident Mocker," since, for a number of years, the bird appears not to have left the Arboretum or nearby grounds at any season of the year.

So much has now been written about this more than locally-celebrated songster (*Mimus polyglottos polyglottos*), whose reputation for vocal ability promises to rival that of any bird of this

race yet recorded, that certain additional and important facts, not generally known, deserve a place in the record to complete as far as possible the history of the bird while he has abided in Boston, Massachusetts.

My first meeting with this Mocker took place on May 20, 1915, at which time a fellow bird student informed me that the bird had wintered in the Arboretum, having made its first appearance here in 1914. On this occasion the Mocker was in full song and even at this time his proficiency as a singer of other birds' songs was recognized. From the fact that I was told that the bird was first observed during the previous year, I have always referred to him in my notes as the "1914 Mocker." As Mr. Wright, in the article referred to above, p. 389, states that the bird was first seen here January 10, 1915, I have taken occasion to examine the basis for the belief, also current among other ornithologists, that he had passed the entire winter of 1914–15 in the Arboretum, and had therefore arrived here in 1914. Without going into unnecessary details, the evidence sought was obtained from Miss Julia A. Carter, Secretary to Prof. Charles S. Sargent, who for a number of years has made a practice of recording in her diary any unusual birds reported to her as having been seen in the Arboretum by Mr. Charles Faxon, who was associated with Prof. Sargent in his arboricultural work. Miss Carter kindly furnished me with a transcription of her ornithological notes, among which I find that on November 25, 1914, a Mockingbird was seen here, the first one reported in the Arboretum by Mr. Faxon since May 7, 1910. That Mr. Faxon saw this bird in the fall of 1914 is also confirmed by Mr. van der Voet, Superintendent of the Grounds, who informs me that Mr. Faxon also told him that the Mockingbird which afterwards became so well known, first appeared here at that time.

On page 395 of Mr. Wright's article, he mentions that Mr. van der Voet informed him on May 17, 1920, that "An observer had told him that he (the observer) had seen a second Mocker in the Arboretum a few days previous." Also, p. 395, Mr. Wright alludes to the "Alleged appearance of a second bird, presumably a female" and comments thereon at some length. In regard to his "Second Mockingbird," it should be stated that Mrs. Whittle

and I first ran across the new bird, apparently a female, on March 24, 1920, and we also saw the bird again on the following March 27 in the same place; and on one of these occasions we informed Mr. van der Voet of the fact and asked him to report to us if the new bird later associated with the Resident Mocker, or paired with him, for, on the two occasions mentioned, it was a singular fact, considering, that as far as known, no other female of this species had been in the Arboretum during the previous five and a half years, that the male bird kept by himself in one part of the Arboretum, vigorously mimicking other birds and singing his own song. The female, meanwhile, kept strictly by herself on the other side of the park, the two birds being not over seven hundred feet apart. The new Mocker gleaned her subsistence from the ground under hickory trees, and probably the pits, rendered available by the frost in opening the shells, formed the main part of her diet. During our visits on these dates her only note was a single, somewhat harsh cry, a note never uttered by the male during my five years' acquaintance with him so far as I am aware.

The above paragraph is written for the reason that I believe some confusion in the published record of the male Mocker has come about due to mistaking the female for the male, both by Mr. Early and by Mr. Wright. For example, Mr. Wright says, p. 395, that he saw the Resident Mocker on April 24 and 29, 1920, but he says it was not heard to sing. The presumption is that he was unknowingly observing the female, for at this season of the year and with temperature and other weather conditions as they were on these dates, namely, a maximum temperature of 54 degrees on April 24, and 59 degrees on April 29, the male bird was characteristically in song much of the time. Mr. Early, writing in 1921. 'Bird-Lore,' loc. cit., p. 179, speaks of seeing the "Mockingbird of the Arboretum," almost every time that he visited it "during the past six years." This statement may be true enough if the Mocker seen by him in January 1921 (see p. 180) was the Resident Mocker, but incorrect if he too mistook the new bird for the old one.*

* Since writing the above paragraph, 'The Auk' for October 1921, has been issued, and on p. 617, under "Recent Literature," Mr. Early's article in 'Bird-Lore' is briefly reviewed, the comment being that his article "Carries the history

In support of the contention that such confusion has occurred and that we have no positive knowledge that the 1914 Mocker has been seen or heard in the Arboretum since July 10, 1920, as reported to me by Mr. Early in a recent letter, or that he was seen by Mr. Early in January 1921, as stated in his article, loc. cit., pp. 180 and 181, I offer the following considerations, the principal ones being,—first, the fact that no one, among all the observers who are familiar with the bird, and its song, and I have canvassed the field rather thoroughly, bears testimony that it has been heard singing since July 10, 1920; and, second, the sudden appearance of a new Mocker, believed to be a female, about three months earlier, namely March 24, 1920; one bird leaves the scene shortly after another appears, and observers generally, and there are several of them, are not cogizant of the fact. It should be stated, however, that Mr. C. S. Anderson reports seeing and hearing a Mocker sing on one occasion, sometime during the spring of 1921, his oral report being that "The bird sang in a manner characteristic of the Resident Mocker but in a cracked voice." The bird was reported near the Bussey Institution. As no notes of the occurrence were taken by him and as the exact date is unknown, the value of the testimony is considerably impaired.

To any one thoroughly familiar with the singing ability, manner and times of singing and with the habits of the Resident Mocker such as his feeding places, the kinds of food eaten, and areas within the Arboretum frequented by him, the behaviour of the Mocker seen since July 1920 is in great contrast. During my acquaintance with the bird from May, 1915, to March, 1920, I have seldom found him any where except in the southeast portion of this park or just outside of it near the Forest Hills entrance among the small Siberian crab trees whose fruit in winter, rendered sweetish by frequent freezings and thawings, constituted his favorite and most dependable food.

The new Mocker when first seen remained in an area of its own well outside of the one frequented by the singing bird, and during

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of this notable bird so fully described by the late Horace W. Wright (Auk, July, 1921) on for another year." One of the purposes of this article is to forestall just this kind of error from appearing in ornithological publications, for it seems patent that the history of this talented Mocker is likely to be widely referred to both in foreign and in American literature.

the winter of 1920–21 the Mocker in the Arboretum was distinctly not a permanent resident for it appeared rarely and irregularly within the park and was absent, or at least undetected, for days at a time and then was seen at different places from one end of the grounds to the other. The principal winter food of the resident bird, Siberian crab apples, appears not to be eaten by the newcomer. Added to these contrasts in behaviour is the testimony of Mr. van der Voet, who is daily afield in the Arboretum all through the open season, that from May 1920 to October 1921 he has not heard a Mockingbird sing there, an observation in accordance with my own experience.

From the above considerations and from Wright's and Early's articles, I think we may safely conclude that the Resident Mocker, at least as far as continuous residence in the Arboretum is concerned, was first observed there on November 24, 1914, by Mr. Faxon, and was last heard there by Mr. Early on July 10, 1920, and was therefore, a permanent resident for five years and a little over seven months. It is not to be inferred from above that I have knowledge of the death of the bird for such is not the case. It is well within the realm of possibility that he may again take up his residence in the Arboretum and add still other songs to the following phenomenal list of imitated songs and calls.

Mr. Wright has enumerated fifty-one species of birds whose songs or calls were heard imitated and recognized by him. An inspection of this impressive list shows that several calls of some species were heard mimicked. For example, he writes of the Blue Jay that "All its various voicings" were imitated, p. 391. Not knowing all the various voicings of this bird I cannot know how many songs or calls Mr. Wright had in mind, although I have heard the Mocker give six different calls of the Blue Jay in the space of a few minutes and will, therefore, use this number in estimating the total number of songs and calls of the fifty-one species reported by him and such other species as I am personally able to add to his list, plus three or four from other observers. (See tabulation.)

In considering the history of this bird it is natural to inquire where he was probably born and raised and how he obtained the necessary contact with singing birds to enable him to learn such

an extensive and varied list of songs and call notes. While chiefly a bird of the Austral Zones, the Mocker also nests sparingly in the Transition Zone. Of the five characteristically southern species imitated, the Carolina Wren is not known to nest in Massachusetts; the Yellow-breasted Chat infrequently nests here; and the Cardinal is on record as having nested but once in the state. The White-eyed Vireo and the Mourning Dove are only very locally fairly common summer residents, but do not nest in the Arboretum or its vicinity and in fact probably seldom visit it, so that a knowledge of the songs and calls of these species was certainly acquired elsewhere and presumably well south of New England, very likely in the Upper Austral Zone. Most of the songs imitated could, however, have been heard while the Mocker resided in the Arboretum and Mr. Wright noted the growing proficiency in the bird's mocking powers during its residence here. The bird's phenomenal ability to acquire and remember songs and calls is shown by his knowing the song of the Ruby-crowned Kinglet and several calls of the Olive-backed Thrush, birds which tarry only a short time and sing little in this region as they pass through in migration.

My own observations and those of others show that the fruits of the following plants have formed an important part of the Mocker's diet while he has lived in the park:

Pokeweed (*Phytolacca decandra*).
Juneberry (*Amelanchier canadensis*).
Hop Hornbeam (*Ostrya virginiana*)
Barberry (*Berberis*, various species).
Inkberry (*Ilex glabra*).
Black Alder (*Ilex verticillata*).
Highbush Cranberry (*Viburnum opulus*).
Siberian Crab Apple (*Pyrus baccata*).
Corktree (*Phellodendron chinense*).

In order that this bird's record as a mocker may be easily consulted, I have prepared a table giving a list of all the birds imitated by him, both their songs and their calls, which includes the fifty-one species given by Mr. Wright and seven additional birds that have been heard mimicked by other reliable observers. By interviews and correspondence I have come into possession of pertinent information regarding this Arboretum bird from a number of the local observers who have furnished, among other

TABULATION OB BIRDS IMITATED BY THE "RESIDENT MOCKER" OF THE ARNOLD ARBORETUM. LISTED IN THE ORDER OF THE 'CHECK-LIST OF N. A. BIRDS' (THIRD EDITION).

Name	Songs (Wright)	Calls (Wright)	Authority	Also Reported by	Remarks*
Black Duck (*Anas rubripes*)			Jessie E. Kloseman		Craking call.
Bob-White (*Colinus v. virginianus*)		1	H. W. Wright	Annie W. Cobb	"Scattered" (sic) call.
Ring-necked Pheasant (*Phasianus torquatus*)			C. H. Early		No number in check list. Call note.
Mourning Dove (*Zenaidura macroura carolinensis*)		1	H. W. Wright		"Coo."
Red-shouldered Hawk (*Buteo l. lineatus*)		1	"	Mrs. M. M. Kaan, C. L. Whittle	
Sparrow Hawk (*Falco s. sparverius*)		1	"	L. R. Talbot, C. H. Early, Mrs. M. M. Kaan, C. L. Whittle	"Killy-Killy."
Cuckoo (*Coccyzus* sp?)		1	"		Species not given.
Belted Kingfisher (*Ceryle alcyon*)		1	"		"Rattle" notes.
Hairy Woodpecker (*Dryobates v. villosus*)		1	"		
Downy Woodpecker (*Dryobates pubescens medianus*)	1	1	"	Annie W. Cobb, C. L. Whittle	
Flicker (*Colaptes auratus luteus*)	1	1	"	E. E. Caduc, Mrs. M. M. Kaan, Annie W. Cobb, C. L. Whittle	"Song and Flicking."
Whip-Poor-Will (*Antrostomus v. vociferus*)	1		"	Annie W. Cobb	
Nighthawk (*Chordeiles v. virginianus*)		1	"	Margaret Bradbury	
Kingbird (*Tyrannus tyrannus*)	1		"	L. R. Talbot, C. E. Clark, Annie W. Cobb	Call (Miss Cobb)

* Quotation marks indicate matter from Mr. Wright's article or from his personal notes.

Name	Songs (Wright)	Calls (Wright)	Authority	Also Reported by	Remarks*
Crested Flycatcher (*Myiarchus crinitus*)		1	H. W. Wright	Annie W. Cobb	Song
Phoebe (*Sayornis phoebe*)	1		"	L. R. Talbot, Edith McL. Hale, I. P. Gammon Jr., Mrs. M. M. Kaan, Florence Nelson, Annie W. Cobb, C. L. Whittle	Call (Miss Cobb)
Chebec (*Empidonax minimus*)			C. L. Whittle		Song
Blue Jay (*Cyanocitta c. cristata*)		2	H. W. Wright	L. R. Talbot, C. H. Early, E. H. Atherton, Annie W. Cobb, Edith McL. Hale, C. E. Clark, I. P. Gammon, Jr., E. E. Caduc, Mrs. M. M. Kaan, C. L. Whittle	"All the voicings of the Blue Jay" calls (Mrs. Kaan), one, Ta-Lee-dle; six calls (C. L. Whittle'-
Crow (*Corvus b. brachyrhynchos*)		1	"	Annie W. Cobb, C. L. Whittle	
Starling (*Sturnus vulgaris*)		1	"	L. R. Talbot, E. E. Caduc	
Red-winged Blackbird (*Agelaius p. phoeniceus*)		2	"	Annie W. Cobb, Mrs. M. M. Kaan, L. R. Talbot, C. L. Whittle	Song (Miss Cobb)
Meadow Lark (*Sturnella m. magna*)		2	H. W. Wright	Mrs. M. M. Kaan, Annie W. Cobb	Song heard by Miss Cobb. "Rattle call."
Baltimore Oriole (*Icterus galbula*)	1	1	"	L. R. Talbot, Annie W. Cobb C. L. Whittle	"Song and chatter call" Whistle (Whittle).
Bronzed Grackle (*Quiscalus q. aeneus*)		1	"	Mrs. M. M. Kaan	
Purple Finch *Carpodacus p. purpureus*)			L. R. Talbot		Song
House Sparrow (*Passer d. domesticus*)		2	H. W. Wright	C. H. Early	Not in check list.
Chipping Sparrow (*Spizella p. passerina*)	1		"	Annie W. Cobb, C. H. Early	Call (Miss Cobb) "Trill."
Field Sparrow (*Spizella p. pusilla*)	1		"		
Junco (*Junco h. hyemalis*)			C. L. Whittle		Song

* Quotation marks indicate matter from Mr. Wright's article or from his personal notes.

Name	Songs (Wright)	Calls (Wright)	Authority	Also Reported by	Remarks*
Song Sparrow (*Melospiza m. melodia*)	1		H. W. Wright	C. H. Early, Mrs. M. M. Kaan	
Chewink (*Pipilo e. erythrophthalmus*)	1	1	"	L. R. Talbot, C. H. Early, C. E. Clark, Edith McL. Hale, Mrs. M. M. Kaan, Annie W. Cobb, C. L. Whittle	2 songs (Whittle)
Cardinal (*Cardinalis c. cardinalis*)	1		"		
Rose-Breasted Grosbeak (*Zamelodia ludoviciana*)	1		"	Mrs. M. M. Kaan, Annie W. Cobb	
Scarlet Tanager (*Piranga erythromelas*)	1	1	"		"Chip-Chur."
Cliff Swallow (*Petrochelidon l. lunifrons*)		1	"		
Barn Swallow (*Hirundo erythrogastra*)	1		"		
Tree Swallow (*Iridaprocne bicolor*)	1		"		
Northern Shrike (*Lanius borealis*)		1	"		"Whistle."
Red-eyed Vireo(*Vireosylva olivacea*)	1		"	Annie W. Cobb	
Warbling Vireo (*Vireosylva g. gilva*)	1		"	Edith McL. Hale, C. L. Whittle	
Yellow-throated Vireo (*Lanivireo flavifrons*)	1		"		
White-eyed Vireo (*Vireo g. griseus*)	1		"		
Yellow Warbler (*Dendroica a. aestiva*)	1		"	C. H. Early, Annie W. Cobb	Call (Miss Cobb)
Oven Bird (*Seiurus aurocarpillus*)	1		"		"Teacher Song."
Yellow-breasted Chat (*Icteria v. virens*)			C. L. Whittle		Call
Catbird (*Dumetella acrolinensis*)	1	1	H. W. Wright	C. H. Early, E. H. Atherton, E. E. Caduc, Florence Nelson, Mrs. M. M. Kaan, Annie W. Cobb, C. L. Whittle	
Brown Thrasher (*Toxostoma rufum*)	1		"	C. H. Early, E. H. Atherton, E. E. Caduc, Mrs. M. M. Kaan, Annie W. Cobb, C. L. Whittle	

* Quotation marks indicate matter from Mr. Wright's article or from his personal notes.

Name	Songs (Wright)	Calls (Wright)	Authority	Also Reported by	Remarks *
Carolina Wren (*Thryothorus l. ludovicianus*)	1		H. W. Wright		
House Wren (*Troglodtyes a. aedon*)....	1		"		
White Breasted Nuthatch (*Sitta c. carolinensis*)	1	1	"	E. E. Caduc, C. L. Whittle	
Chickadee (*Penthestes a. atricapillus*)..	1	1	"	L. R. Talbot, E. E. Caduc, E. Edith M. S. Hale, Annie W. H. Atherton, C. E. Clark, Cobb, I. P. Gammon, Jr., C. L. Whittle	"Phebe" and Dee dee Call.
Ruby-crowned Kinglet (*Regulus c. calendula*	1	1	"		
Olive-backed Thrush (*Hylocichla ustulata swainsoni*)		3	"		"Pip and Querulous." Calls.
Robin (*Planesticus m. migratorius*)....	1	1	"	L. R. Talbot, C. H. Early, E. H. Atherton, C. E. Clark, I. P. Gammon, Jr., Florence Nelson, Annie W. Cobb, C. L. Whittle	"Cackle Call."
Bluebird (*Sialia s. sialis*).....	1		"	L. R. Talbot, E. E. Caduc, Mrs. M. M. Kaan, C. L. Whittle	
Canary (*Fringilla canaria*).....	1		"	Annie W. Cobb	
Bantam.....	1	2	"	Annie W. Cobb	"Bantamfowl's barnyard voicing." "Crow."
Chicken.....			J. B. Brainerd	L. R. Talbot	Peep (Brainerd).
Frog.....		1	H. W. Wright		"Gutteral Roll."
Cricket.....		1	"		"Chirp."

* Quotation morks indicate matter from Mr. Wright s article or from his personal notes.

matters, the several imitated songs added to Mr. Wright's list. These birds are the Purple Finch (L. S. Talbot), Ring-necked Pheasant (C. H. Early), the Black Duck (Jessie E. Kloseman) and the common chicken (J. B. Brainerd). I can personally add the songs or calls of the Chebec, Junco and the Yellow-breasted Chat. That Mr. Wright should have heard and identified fifty-one of the fifty-eight species known to be mimicked, indicates how thoroughly the bird was studied by him in the field.

Songs and calls were not the only forms this bird's mocking abilities assumed, for according to Mr. C. E. Clark (personal communication), in imitating the Kingbird's notes, the bird would often mount into the air and on quivering wings deliver the notes in true Kingbird fashion. Mr. Early also mentions seeing the bird turn sommersaults in the air on one occasion while it was exhibiting its powers as a mimic. Flight singing and other ecstatic courtship movements are not uncommonly indulged in by this species, but I find no other mention in ornithological literature of its turning somersaults, so that it is not unlikely in this case that the bird was copying the performances of the Tumbler Pigeon.

Part of my purpose in gathering the data contained in the tabular list was to obtain confirmation as far as possible of the observations of Mr. Wright, not that there is any doubt as to the accuracy of his work; but where a record exists so astonishing as this Mockingbird's, it is well to have it as complete as possible by having it verified in detail by independent observers. Of the fifty-one birds enumerated in Mr. Wright's article, thirty-three have been confirmed by the records of other competent observers and such confirmations range from one to nine for the different species. The number of independent observers who have furnished confirmation is thirteen. (See table).

The Resident Mocker's record of imitated bird songs, calls and other sounds stands as follows:

Bird songs imitated	39
Birds calls imitated	50
Other sounds (frog and cricket)	2
Total imitated sounds	91

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NOTES ON SOME LABRADOR BIRDS.

BY HARRISON F. LEWIS.

Plate XIX

As a part of the enforcement of the Migratory Birds Convention Act by the Department of the Interior, Dominion of Canada, I visited the southern coast of the Labrador peninsula during the summer of 1921, travelling from the extreme western end of that coast to Blanc Sablon, on the Straits of Belle Isle, inspecting and protecting the sea-bird colonies, and overseeing the work of the Dominion Bird Officers stationed throughout the region. Certain of the observations made on this journey appear to be sufficiently valuable to be worthy of record.

My itinerary was as follows: Leaving Quebec by the steamer "North Shore" on June 3, I entered Labrador, at the "point where the fiftieth parallel of latitude strikes the coast a short distance to the west of the Bay of Seven Islands" (Townsend[1]), on the afternoon of June 4. I debarked at Mingan on June 6. Leaving there on June 13, I travelled, chiefly in small motorboats, and with frequent delays, to Blanc Sablon, on the eastern boundary of the Dominion of Canada, where I arrived on July 12. I returned in a motorboat as far as Harrington, sailed from Harrington on the steamer Aranmore on July 28, passed the southwestern boundary of Labrador on the night of July 29, and debarked at Quebec on July 31.

The fact of chief importance brought out by the observations made is that the breeding sea-birds of this coast are markedly more numerous than recent literature on the subject would lead one to suppose. Not only has there been a noticeable increase in their numbers in the past few years, due to the protection given them in Canada and the United States by the Migratory Birds Convention, but the unanimous testimony of the residents of the Labrador coast is to the effect that, in spite of the awful

[1] 'In Audubon's Labrador,' 1918, p. 32.

destruction that has taken place among these birds, they were never actually as scarce as has been reported. There is every reason to expect them to continue to increase as long as the present protection is continued. A total of 79 species was observed in life by me in Labrador.

At the kind suggestion of the Ornithologist to the Canadian Geological Survey, Mr. P. A. Taverner, I have appended to my own notes a few notes of interest, relating to Labrador birds, and based upon specimens in the possession of the Victoria Memorial Museum, Ottawa.

I am much indebted to Dr. Charles W. Townsend for reviewing the manuscript of this paper.

1. **Fratercula arctica arctica.** PUFFIN.—One Puffin was seen on June 7 near the Perroquet Islands of Mingan. On June 13, at Bald Island, near Betchewun, I saw about 20 Puffins, and, in a hasty walk over the island, found 6 or 7 Puffin burrows. This colony appears to have decreased very much since 1909, when Townsend and Bent[1] "found about 150 pairs" of Puffins there. I was repeatedly informed from different sources that the largest colony of Puffins on the entire Canadian Labrador coast was on islands near Wolf Bay, and I saw a few Puffins as I rapidly passed that vicinity on June 26. On the St. Mary's Islands on July 5 I actually saw about 200 Puffins. Probably not less than 250 pairs of these birds breed there. I was reliably informed that a few Puffins still breed on Treble Hill Island, near Great Mecattina. The famous colony of Puffins on Perroquet Island, at Bradore, is still very large and thriving. Mr. R. T. Christie, who was camped near this island as Dominion Warden during the summer of 1921, estimated the number of Puffins there as about 50,000 and stated that early in the season, before incubation caused at least one-half of the birds to be always out of sight in the burrows, the entire side of the island toward him was white with them each evening at sunset, when all had returned from the day's fishing. On July 10, late in the afternoon, I estimated that I saw about 12,000 Puffins at this island, which would mean that, including the incubating birds, at least 20,000 to 25,000 Puffins were nesting there. There may be more, as, with such large numbers, exact estimates are impossible, and I have preferred that any error in my figures should be on the side of conservatism. The fact that Townsend and Allen, who passed this island in 1906, say[2] of the Puffins seen there, "There were at least 500 of them, perhaps many more," and that Townsend says[3] of his visit to the island in 1915. "The birds were

[1] 'Additional Notes on the Birds of Labrador,' Auk, Vol. XXVII, No. 1, p. 7.
[2] 'Birds of Labrador,' Proc. Bost. Soc. Nat. Hist., Vol. XXXIII, p. 303.
[3] 'In Audubon's Labrador,' 1918, p. 239.

noticeably less in number than they were when I passed the island in 1906," is readily explainable. I visited the island on July 10, 11, 12, and 14, and found that at times, in the middle of the day, when conditions for fishing were good, not more than 100 Puffins remained in sight near the colony. I saw Puffins, doubtless from this island, fishing as far as twenty miles away. Mr. R. T. Christie informed me that he estimated that on Greenly Island, which is a few miles south of Perroquet Island, and which he visited frequently, though I did not go there, the number of nesting Puffins was about one-half of the number nesting on Perroquet Island.

2. **Cepphus grylle.** BLACK GUILLEMOT.—Generally distributed from Mingan to Old Fort. Average number seen in one day's cruising, 19; largest number seen in one day, 47 (between Mingan and Betchewun).

3. **Uria troille troille.** MURRE.—While this species is not now known to breed on the Labador coast west of Natashquan, there are several colonies between Natashquan and Blanc Sablon which, with present protection, may again resume the appearance which they had when Audubon visited them. Dr. C. W. Townsend visited in 1915 a colony of about 2000 Murres at Outer Island. off Coacoachou Bay,[1] and another large colony at Gull Island, off Cape Whittle.[2] Circumstances prevented my visiting either of these colonies in 1921, but I have no reason to think that they are not in a flourishing condition. On Black Duck Island, a few miles east of Wapitagun, I found about half-a-dozen pairs of Murres on June 28. I estimated that, at St. Mary's Island, on July 5, I saw about 500 Murres. On these islands the Murres engaged in incubation are hidden in great crevices in the rocks, and, during the day, most of their mates are away fishing, so that I saw a comparatively small part of the colony. Probably more than 1000 pairs of Murres breed there. On Perroquet Island, at Bradore, I saw, on July, 11 and 14, about 20 Murres, and as the incubating birds are hidden on this island also, the total number breeding there is probably more than 40 pairs. I received reliable reports of a large Murre colony at The Bluff, between Romaine and Coacoachou Bay, of another on one of the Marianne Islands, near St. Mary's islands, and of a small colony on Treble Hill Island. It is said that, on the Murre Rocks, near Mecattina Harbor, about 400 Murres still breed. "Ringed" Murres were seen at Black Duck Island and at St. Mary's Island. They constituted about 25% of the total number of Murres seen, and, as far as I could discover, showed no tendency whatever to segregation.

4. **Alca torda.** RAZOR-BILLED AUK.—Mr. A. C. Bent stated[3] in 1919, "A few pairs of Razor-billed Auks may still breed on some of the islands off

[1] 'In Audubon's Labrador,' Auk, Vol. XXXIV, No. 2, p. 140.
[2] l. c., p. 141.
[3] 'Life Histories of North American Diving Birds,' Bull. 107, U. S. Nat. Mus., p. 202.

the southern coast of Labrador . . . , but the only colony of any size still remaining is on that impregnable sea-birds' stronghold, Bird Rock." Unfortunately Mr. Bent himself had never visited the Labrador coast between Natashquan and Bonne Esperance, and I am sure that he, as well as others, will know with pleasure that conditions on those two hundred and twenty-five miles of coast have never been such as to support his statement quoted above. The status of the Razor-billed Auk in that region in 1915 is indicated by the following published statements of Dr. C. W. Townsend: "the waterways abounded in Razor-billed Auks" (near Wapitagun),[1] "There were . . . numerous Razor-billed Auks" (Derby Bay),[2] and "Razor-billed Auks were common" (Perroquet Island).[3] A few miles west of Natashquan on June 21, I saw about 40 Razor-billed Auks, and it is possible that they were breeding in that vicinity. On June 24 and 25 a few Auks were seen between Natashquan and Romaine. East of Romaine on June 26, they were much more numerous. A large colony was seen near Wolf Bay, and small colonies were passed at frequent intervals as I sailed from Wolf Bay to Harrington. On June 28 I explored four small islands of the extensive Wapitagun group, and saw two or three hundred Razor-billed Auks breeding on them. About two hundred Auks were found at Black Duck Island on the same date, and many of their eggs were seen there. Doubtless similar conditions are to be found on others of the many similar islands in this vicinity. On St. Mary's Islands on July 5, I estimated that I saw 1200 Razor-billed Auks. Not less than 1500 pairs of these birds must have been breeding there. Small breeding colonies of Auks were also reported to exist on the Murre Rocks and on Treble Hill Island. On Perroquet Island, at Bradore, the number of Razor-billed Auks seen varied from day to day, but the number seen on July 11 was estimated at 150, and it is probable that about 100 pairs of this species were breeding there.

5. **Larus marinus.** GREAT BLACK-BACKED GULL.—These wary birds continue to breed in considerable numbers along the southern coast of Labrador.

6. **Larus argentatus.** HERRING GULL.—This species breeds commonly wherever there are islands from the Bay of Seven Islands to Blanc Sablon. As its eggs and young are good eating, it has suffered much from human enemies, and is far less common than it should be in a region so well suited to its needs. It is hoped that the next few years will see a marked increase in its numbers along this coast.

7. **Larus delawarensis.** RING-BILLED GULL.—I saw a dead specimen on Black Duck Island, a few miles east of Wapitagun, but my only certain record of living birds is from the small island near Pointe au Maurier where Townsend in 1915 found[4] a colony containing some five hundred

[1] "In Audubon's Labrador," 'Auk,' Vol. XXXIV, No. 2, p. 141.
[2] l. c., p. 142.
[3] 'In Audubon's Labrador,' 1918, p. 240.
[4] 'In Audubon's Labrador,' Auk,' Vol. XXXIV, No. 2, p. 141.

individuals. I was told that this colony continued to thrive until 1921. In the spring of that year the Gulls returned to their island as usual, but after a few days nearly all of them, for some cause unknown, disappeared no one knew whither. Less than a dozen pairs remained to nest on the island where the colony had been accustomed to breed. These Gulls had been systematically robbed for many years of their first sets of eggs; they had been allowed to hatch later sets and to bring up in peace the young hatched from these. Under this treatment the colony had increased, and it was considered by residents of the vicinity to be a model of the "right way" to rob Gulls' nests. It seems possible, however, that the Gulls finally rebelled against the annually recurring unnatural drain upon their strength which this robbing involved, and that their abandonment of their old home resulted from this.

8. **Sterna hirundo.** COMMON TERN.—This is still a common breeding species from the Perroquet Islands of Mingan to the Netagamiou Islands, near Harrington. No Arctic Terns were identified.

9. **Sula bassana.** GANNET.—My records of the Gannet in Labrador in 1921 are as follows: 12 adults near Long Point of Mingan, June 7; 5 immature birds near Harrington, July 5; 3 immature birds near Mutton Bay, July 6; 2 immature birds near Natashquan, July 28; and about 10 immature birds and from 40 to 50 adults between Mingan and Thunder River, July 29. As the very small island near Mingan on which this species formerly nested is now occupied by the lighthouse, there is little hope that Gannets will ever breed there again.

10. **Somateria dresseri.** AMERICAN EIDER.—The Eider was found to be a common breeding bird from the vicinity of Mingan to the vicinity of Old Fort. On June 9, about the Birch Islands and Harbor, or Mingan, Island, near Mingan, I counted 574 Eiders, and could easily have increased this number very much without visiting additional islands had counting Eiders been my sole occupation for the day. Owing to a combination of favorable conditions, the Eiders breeding on this coast were considered by the residents to be enjoying in 1921, one of the most successful breeding seasons within memory. On June 24 I found an Eider's nest with 6 eggs on a bush-covered rock in the midst of the second falls of the Kegashka River, more than a mile from the sea. In an expansion of the river nearby, I saw 7 female Eiders swimming about. Residents of the vicinity informed me that considerable numbers of young Eiders descended this river each autumn. It would be interesting to know just how and at what age the young Eiders from the nest which I found left their birth-place, situated as it was in the midst of a foaming cataract.

11. **Branta bernicla glaucogastra.** BRANT.—A flock of 200 and another of 25 were seen flying westward at Mingan, June 9. A single bird was seen at Eskimo Point, June 13.

12. **Botaurus lentiginosus.** AMERICAN BITTERN.—The familiar "pumping" of a male was heard at close range from a small swamp near the beach three miles west of Mingan on June 6, 8, and 9.

13. **Lobipes lobatus.** NORTHERN PHALAROPE.—A flock of about 1000 was seen on the surface of the water near the Perroquet Islands of Mingan on June 7.

14. **Buteo borealis borealis.** RED-TAILED HAWK.—One was seen near Mingan on June 11 and two togeher near Piashte Bay on June 16. I was able to observe clearly the broad red tail of the Mingan bird and that of one of the Piashte Bay birds.

15. **Falco columbarius columbarius.** PIGEON HAWK.—On June 22, I found, a few rods west of the first falls of the Little Natashquan River, a rather unusual nest of this species. It was on the ground, among the Reindeer lichen, on the summit of a small knoll of gentle slope. A black spruce "tree" which had grown here for many years, until it had attained a height of about 3 feet and a width of 6 feet, had died, apparently two or three years previously, leaving a confused snarl of stiff dead limbs. The Pigeon Hawks had placed their nests beneath this shelter. The nest, which was about 6 inches across and 1 inch deep, was a depression in the soil, here composed of sand and rotten wood, and was lined with a few small scales of bark, picked by one or both of the Hawks from the base of the trunk of the sheltering "tree," as was clearly indicated by the recent scars on that trunk. Four eggs rested on these bits of bark. One Hawk flew from the nest when I approached it, and it and its mate scolded me vigorously, charging repeatedly to within a few feet of me, as long as I remained in the vicinity. A nest of the Pigeon Hawk in a very similar situation in Newfoundland has been described by W. J. Brown.[1]

16. **Chordeiles virginianus virginianus.** NIGHTHAWK.—One was heard calling in the dusk at Piashte Bay on June 14.

17. **Nuttallornis borealis.** OLIVE-SIDED FLYCATCHER.—One was seen and heard repeatedly near Mingan on June 11, 12, and 13, and another was observed near Piashte Bay on June 16.

18. **Empidonax trailli alnorum.** ALDER FLYCATCHER.—At Lake Patterson, near Mingan, on June 11, two Alder Flycatchers were heard calling (or "singing.") repeatedly from the depths of a dense and extensive growth of alders. I was able to identify their notes with certainty, as years of residence in Nova Scotia and Quebec had made me very familiar with the notes of the Alder, Yellow-bellied, and Least Flycatchers, and I was hearing numerous Yellow-bellied birds every day. The harsh "Waaaow," of the Alder Flycatcher is quite unlike the "Chebec," of the Least or the "Jelet," of the Yellow-bellied. I made repeated attempts to see these two Alder Flycatchers, not desiring to present a record from voice alone if it could be avoided, but the alders were so luxuriant and the birds were so shy that I could not obtain even a glimpse of them. The

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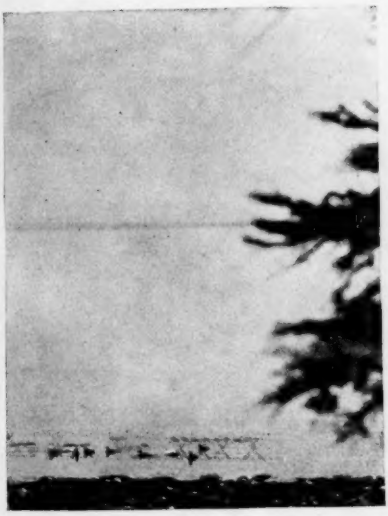
[1] 'Unusual Nesting Site of the Pigeon Hawk in Newfoundland,' Ottawa Naturalist, Vol. XXVI, p. 70.



PHOTOS BY HARRISON F. LEWIS. PUBLISHED BY PERMISSION CANADIAN NATIONAL PARKS

2. Common Murre rushing forth from nesting crevice. St, Mary's Islands, P. Q. July 5, 1921.

2. Eider Ducks courting. Greater Birch Island near Mingan, P. Q. June 9, 1921.

3. Puffins on ledge, Perroquet Island, Bradore, P. Q. July 10, 1921.

only previous Labrador record of this species appears to be that of Audubon.[1]

19. **Sturnus vulgaris.** STARLING.—A skin of this species was shown to me at the home of Mr. F. W. Salzman, at Betchewun, where it was taken. Under date of August 31, 1921, Mr. Salzman has written to me that this bird was killed "four years ago in April." This is the first Labrador record of the Starling.

20. **Quiscalus quiscula aeneus.** BRONZED GRACKLE.—At the home of Mr. F. W. Salzman, at Betchewun, I was shown the skin of a Bronzed Grackle which had been taken at Betchewun. In his letter of August 31, 1921, Mr. Salzman states, "The Bronzed Grackle I shot near the last of April of this year." Mr. J. L. DeVany, Dominion Bird Officer, has informed me that he saw two or three Bronzed Grackles at Eskimo Point in the first half of May, 1921.

On searching the literature on the subject, I found that several authors stated that the range of the Bronzed Grackle extended to Labrador, but I did not discover any definite published record for the species in that area. However, Dr. Harry C. Oberholser, in response to my inquiry, very kindly informed me, in a letter dated September 22, 1921, that "All the statements of the occurrence of this bird in Labrador are based on the record of a Mr. Weiz, who found the bird at Okak, and recorded it as Quiscalus niger in the 'Proceedings' of the Boston Society of Natural History, vol. X, 1865, p. 267."

After consulting this record, I desire to point out:

(1). That "*Quiscalus niger*" is the only species of Blackbird recorded in Labrador by Weiz.

(2). That Townsend and Allen state[1] that the Rusty Blackbird, *Euphagus carolinus* is a common summer resident throughout Labrador except in the Arctic zone. They quote Turner as saying that it is common and breeds at Fort Chimo, which is slightly farther north than Okak, where Weiz resided. They quote Low as saying that it is common throughout the interior (of the peninsula). They give several other records. As Weiz lived at Okak for seventeen years, it would be rather strange if he observed no Rusty Blackbirds in that time, as we must suppose to be the case if his "Q. niger" refers to the Bronzed Grackle.

(3). Okak is far to the northward on the Atlantic Coast of Labrador. If the Bronzed Grackle reached Labrador at all, it would be reasonable to expect it first in the southern or the southwestern part of the peninsula, rather than in the vicinity of Okak.

(4). I have not found "*niger*" among the synonyms of *Quiscalus q. aeneus*, but Ridgway gives,[2] in the synonymy of the Rusty Blackbird:

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[1] 'Ornithological Biography,' 1839, Vol. 5, p. 289.
[1] 'Birds of Labrador,' Proc. Bost. Soc. Nat. Hist., Vol. XXXIII, p. 389.
[2] 'Birds of North and Middle America,' Part II, p. 248.

[*Scolecophagus*] *niger* Bonaparte Consp. Av., i, 1850, 423.
[*Scolecophagus*] *niger* Cabanis, Mus. Hein., i, 1851, 195.

(5). There is no other record of the Bronzed Grackle in any part of Labrador until 1921, when the species occurred in the southwestern part of the peninsula, as noted above.

Therefore I conclude that Weiz's record of *Q. niger* at Okak cannot be considered a valid record of the Bronzed Grackle, and that the first Labrador record for the latter bird is that of the specimen taken by Mr. Salzman. Dr. Oberholser, in a letter dated October 25, 1921, has expressed his complete agreement with these conclusions.

21. **Spinus pinus pinus.** PINE SISKIN.—This species was found to be common all along the coast, from Mingan (June 8) to Bradore (July 13). It was last seen at Harrington on July 27. It was as common in treeless regions as in those where forests grew.

22. **Melospiza melodia melodia.** SONG SPARROW—To my great surprise, I found a Song Sparrow among the bushes in a sheltered swamp on Bald Island, between Long Point and Mingan, on June 7. I saw the bird and its characteristic markings clearly at close range through binoculars (x3) and heard it sing several times. On June 11, at Long Point of Mingan, I distinctly heard a Song Sparrow sing in a nearby field, but was unable to take time to look for it. At Natashquan, between June 18 and June 24, I noted five male Song Sparrows, apparently settled on their nesting grounds for the season, as follows: One near steamboat wharf, one near dwelling-house of Robin, Jones, and Whitman's storekeeper, one near telegraph station, one near marsh on lower course of Little Natashquan River, and one near Post Office. Most of these were heard repeatedly and sometimes seen at a distance, but the one near the marsh was seen clearly and studied carefully on June 22. The greatest surprise of all was at Harrington, when, on June 29, in a thicket of bushes and small trees near the cemetery on Hospital Island, a Song Sparrow was heard singing repeatedly. I was able to devote a short time to an attempt to look at it, but succeeded only in obtaining a brief glimpse of it. Mr. J. L. DeVany, a Dominion Bird Officer, informed me that he noted several Song Sparrows at Eskimo Point about May 10, 1921. I have given these records in detail because, in spite of the many visits of ornithologists to this coast, the Song Sparrow has not been recorded previously from it except by Townsend[1] at Blanc Sablon. These observations therefore seem to point to an extension of the range of the Song Sparrow. I should add that I have been familiar with Lincoln's Sparrow and its song for a number of years, and that I was frequently seeing and hearing Lincoln's Sparrows during my stay in Labrador.

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[1] 'In Audubon's Labrador,' Auk,' Vol. XXXIV, No. 2, p. 146.
[2] 'The Mistassini Region,' Ottawa Naturalist, Vol. 4, p. 23.

23. **Bombycilla cedrorum.** CEDAR WAXWING.—In the collection of Mr. Johan Beetz, of Piashte Bay, I saw the skins of two male Cedar Waxwings which he had taken there, one on July 12, 1915, the other on July 24, 1915. I observed a flock of four Cedar Waxwings on Ile a la Proie, near Mingan, on June, 8, 1921. They were engaged in catching low-flying insects on the stony beach. The only previous record of this species in Labrador appears to be that of Dr. A. P. Lowe[2] at Lake Mistassini.

24. **Mniotilta varia.** BLACK AND WHITE WARBLER.—At Mingan, one observed on June 11, and one on June 12. Two noted at Piashte Bay on June 16.

25. **Vermivora ruficapilla ruficapilla.** NASHVILLE WARBLER.—At Mingan, two observed on June 11, and one on June 12. Two noted at Piashte Bay on June 16.

26. **Dendroica aestiva aestiva.** YELLOW WARBLER.—In addition to specimens observed from Kegashka westward, a male in song was seen plainly at very close range near Bradore on July 13, in a dense fog.

27. **Dendroica castanea.** BAY-BREASTED WARBLER.—A singing male was carefully watched at close range with binoculars (x3) and absolutely identified in dense woods about two miles inland from Piashte Bay on June 16. I know of no previous Labrador record of this species, except that of Turner[1] at Hamilton Inlet in 1882.

28. **Dendroica virens.** BLACK-THROATED GREEN WARBLER.—In the vicinity of Mingan this species was found to be common, both on the mainland and on the forested islands, during the period from June 6 to 13. On June 16, between Piashte Bay and the first falls of the Piashte Bay River I saw two male Black-throated Green Warblers and one female, and heard four more males in song. Between Natashquan and the mouth of the Big Natashquan River, on June 23, I heard two males repeatedly sing their distinctive little songs in a small grove of spruce and fir, which, while near me, was on the opposite side of a deep, narrow slough which I was not equipped to cross. Although Townsend has stated[2], concerning the birds of this species, that "it is evident that they pass through the coastal strip and breed only in the interior," my observations recorded above would seem to indicate that a few at least of the species breed on or near the coast at least as far east as Natashquan.

29. **Seiurus aurocapillus.** OVENBIRD.—On June 6 and again on June 12 the unmistakable "Teacher, teacher, teacher" of a male Ovenbird was repeatedly heard issuing from a dense fir woods near Mingan, in which the singer remained securely hidden. Except that Stearns[3] found Ovenbirds in the interior of the Labrador peninsula, there appears to be no previous Labrador record of this species.

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[1] 'List of the Birds of Labrador,' Proc. U. S. Nat. Mus., Vol. 8, p. 237.
[2] 'In Audubon's Labrador,' 1918, p. 43.
[3] 'Notes on the Nat. Hist. of Labrador,' Proc. U. S. Nat. Mus., Vol. 6, p. 116.

30. **Setophaga ruticilla.** REDSTART.—Townsend states[1] that he has not found this species in Labrador east of Piashte Bay. I was able to extend its known range in that region by observing ten individuals, including two females, between Natashquan and the mouth of the Big Natashquan River on June 23.

31. **Sitta canadensis.** RED-BREASTED NUTHATCH.—At Harrington I saw one in stunted woods on Hospital Island on July 23, and three in the same neighborhood on July 27. On the latter date one alighted on my cap, as I sat on the edge of a cliff, and remained there for about half a minute.

ADDITIONAL SPECIES

I. **Podilymbus podiceps.** PIED-BILLED GREBE.—A bird of the year (sex?), obtained by John Goddard at Bonne Esperance, P. Q., during the winter of 1915–16, the skin of which is now in the Victoria Memorial Museum, is the first of this species to be recorded from Labrador.

II. **Mareca americana.** BALDPATE.—In the Victoria Memorial Museum is a specimen in the plumage of the female, obtained at Bonne Esperance in November, 1919, by John Goddard.

III. **Nettion carolinense.** GREEN-WINGED TEAL.—The Victoria Memorial Museum possesses a specimen in the plumage of the male, taken in the autumn of 1914, near Harrington.

IV. **Spatula clypeata.** SHOVELLER.—A specimen of this species in the plumage of the male, taken at Romaine on June 1, 1915, by Michael Blais, is also in the Museum. The only previous record of the Shoveller in Labrador is that of two specimens taken near Cartwright by Dr. W. T. Grenfell in September, 1901.[2]

V. **Cryptoglaux funerea richardsoni.** RICHARDSON'S OWL.—There are two Labrador specimens (sex?) of this species in the Museum. Both were obtained by John Goddard at Bonne Esperance, one in the spring of 1916, and one in the winter of 1920–21. These are the second and the third record, respectively, of this species in Labrador.

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[1] 'In Audubon's Labrador,' 1918, p. 43.

[2] 'Birds of Labrador,' Proc. Bost. Soc. Nat. Hist., Vol. XXXIII, p. 327.

FIELD STUDIES OF THE ANATIDAE OF THE ATLANTIC COAST.*

BY LUDLOW GRISCOM.

THE Anatidae or waterfowl, including the ducks, geese and swans, constitute one of the last groups of birds with which the student of birds in life becomes familiar. This is due to several factors. First, waterfowl are confined to marshes and bodies of water, whereas, the common land birds, as the Robin for example, are widely distributed in settled country. Several species of ducks are numerically equally abundant, but the individuals are massed in a restricted environment. Secondly, for centuries waterfowl have been subjected to constant persecution as game, resulting in a great decrease of their numbers. Most important of all is the steady invasion of their breeding-grounds by civilization.

The struggle for existence has accordingly become more acute as the birds have become fewer and many of their old haunts have disappeared. By nature shy and wary these qualities have become greatly accentuated. The cleverness of Black Ducks and wild geese in eluding schemes for their destruction is proverbial. With care almost any land bird can be approached within a hundred feet, but the student may consider himself fortunate indeed if he approaches within as many yards of a duck. Many species are crepuscular or nocturnal, hiding by day in dense reed-beds or riding the water far from shore. The sea ducks are to be found almost invariably far "off shore." The writer has seen thousands of Scoters so far out at sea that they appeared as mere specks. This is probably an acquired habit, since they are fond of riding the surf in uninhabited stretches of coast.

To the beginner, therefore, the waterfowl are a source of continual discouragement. Much time is spent in the field with few results other than a note-book filled with question marks. The difficulty is greatly increased by one fact, that in popular treatises

* Presented as a thesis for the degree of Master of Arts, Cornell University, 1915. Here somewhat revised and greatly enlarged.

or bird manuals many species of ducks are omitted entirely because of their rarity, and those included are identified by means of plumage or structural characters, which in many cases cannot be employed in the field. The more technical manuals are arranged mainly for the identification of specimens in the hand, some characters of great importance in the field, but others entirely useless. Thus the subfamily *Fuligulinae* is distinguished by having a broadly lobed hind toe, but by no stretch of the imagination could this be determined in a wild bird. The inexperienced student is unable to discriminate, and accordingly unable to make use of these manuals to any great extent. Even the plumage characters have never received thorough treatment. There are only two books extant which treat the subject of field identification competently:—Hoffman's 'Guide to the Birds of New England and New York' and Eaton's 'Birds of New York.' The former is confessedly a popular treatise and most admirably adapted to its purpose. Naturally enough the rare species are omitted and "fine points" are not discussed. Eaton is the only author who has given attention to shape, manner of flight, and such other features as would aid in field identification. As is so often the case, however, this work is not within the reach of most students and cannot be carried in the field because of its physical proportions.

I. METHODS OF IDENTIFICATION.

Fortunately this family of birds exhibits a certain lack of homogeneity in external characteristics. Few groups show a greater variation in color pattern. No other order of birds except the Ralliformes is divided into so many genera in proportion to the number of species. The field characters which I have found useful for the purposes of identification fall into two groups.

(1) *Color markings*—to be used at close range under favorable conditions of light. The maximum distance at which color of plumage can be used safely is about 150 yards, very much less than that for several species. This method, is, of course, the only one which the beginner should use.

(2) *Characteristics of shape and flight, combined with color pattern.*—It is well known that experienced ornithologists, sportsmen and

the better class of baymen are able to name many species of waterfowl with certainty at great distances when color markings are more or less indistinguishable. Tricks of flight, peculiar shapes of body, and the varying amounts of white are in time noted and remembered. The ability to do this for more and more species grows with practice until finally many can be named with certainty when they appear only as black specks to the naked eye, a feat seeming little short of miraculous to the unskilled.

A much more difficult task, however, is that of passing this knowledge on to others in a way to be readily understood and, therefore, useful. It is also much easier to name a duck at a great distance than to prove the identification, without which an observation is devoid of scientific value. In the writer's experience a longer period of years was necessary to prove that certain ducks could be identified accurately at long range than to acquire the ability to do so. This was done by taking advantage of the well known habit of ducks to rise from the water against the wind and then to double back with the wind. To get just the right conditions, a flock of ducks should be approached against a strong wind in a boat. As they flush they can be identified at long range and when they double back past the boat the identification can be made positive thus supplying an excellent check. This check has been employed many times for most species mentioned in this paper.

The second difficulty, that of analyzing and defining these characteristics of shape, flight and color pattern, can be overcome only by visiting favorable localities where many species occur together either during migration or in winter quarters. Gardiner's Island and Currituck Sound are good examples. Another excellent method which aids the solution of both problems at once is the use of a blind in some pond or creek resorted to by several species. The ducks come so close that they may be identified with certainty. By flushing them the differences between them can be noted at great distances with the added advantages of comparison. What is equally important, the distance at which the various species are no longer identifiable can be determined approximately. In most cases it is astonishing how great this distance is. This method has been used successfully in many parts of the country.

A few words should be said by way of definition concerning the field characters used in this paper:—

(1) *Shape.*—The shape of waterfowl varies considerably. Those who are familiar with the common barnyard varieties can distinguish a duck, goose, swan, or even different varieties of poultry by shape alone. It is a matter of common experience. Many species of ducks differ no less decidedly from each other, though in a lesser degree. The Mergansers with their thin heads, long thin necks, and narrow bodies, can be readily contrasted with the Sea Ducks, possessing round, thick heads, short necks and stout bodies. It is not, however, to be supposed for a moment that a person observing a Merganser for the first time would at once recognize it by this characterization. Since these differences in shape are of degree only, hence purely comparative, an acquaintance with the majority of types being a prerequisite to recognizing a new one.

The length of the neck is one of the best methods of separating Anatidae into groups. In flight Swans appear to be about half head and neck, Geese and the Pintail one third, the *Anatinae* Canvasback, Scoters, and Mergansers about a quarter of the total length, and the remaining species even less.

(2) *Flight.*—This is undoubtedly the character which gives the student most trouble. It is also the most difficult of description and illustration. It is best treated under three heads:—

(a) *Shape of wings.*—The wings of the Anatidae differ to a considerable extent. Geese and swans have very broad wings; fresh water ducks, as a rule, possess a long, narrow wing, tapering gradually to a point; the sea ducks are provided with a short, broad wing which tapers rapidly to a blunt point. There are, of course, exceptions and variations in each subfamily which will be discussed later. The point to be emphasized here is the relation of shape of wing and manner of flight. The rapidity of the wing-beats, necessary to maintain a given rate of speed, is much greater in the sea ducks than in the fresh water species. In swans and geese with very broad wings, the flight is a slow flapping, rather than a rapid beating of the wings.

(b) *The arc described by the wings during a single beat.*—Flight is accomplished by raising the wings above the body and then bring-

ing them down forcibly below the body to a greater or less extent. If we can imagine the wing-tip describing a line in space, that line will obviously assume the form of an arc, since the other end of the wing is permanently attached to the body. The figure thus described will be referred to in this paper as the wing-arc. It follows that any peculiarity in flight will produce a variation in this arc. The Black Duck, for instance, rarely brings its wings below the level of the belly except when rising from the water. The arc in this case is little more than half its length in other species. The Baldpate brings its wings way below the body at the down-stroke. The Ruddy Duck raises its wings but little above the body and does not bring them very far below it. The wing-arc in the former will be very long, and in the latter very short. Once the principle of its formation is grasped, an illustration of the wing-arc of any species presents a much better mental picture than an unavoidably lengthy and involved description.

Finally the wing-arcs of all ducks appear to the eye to be at right angles to the median line of the body, with the single exception of the Old-squaw. This is very far from being actually the case. The movements of a bird's wing are very complicated, but they are so very rapid that the eye is entirely unable to distinguish them. It is not in the province of this paper to discuss the mechanics of flight or the reasons why it appears to the eye as it does. The characters used in this paper are those clearly visible to the eye, and as such the wing-arc is taken to be at right angles to the body, unless otherwise stated.

(c) *Position of the body in flight.*—This is an excellent character and is easy of accurate determination. The Mergansers, for instance, hold the bill, head, neck, and body in a straight line during horizontal flight. The Black Duck always flies with the body tipped up at the front. Nearly all ducks fly with the head higher than the body; some point the bill downwards, others hold it parallel to the direction of flight.

(3) *Color pattern.*—At any considerable distance colors resolve themselves into dark and light areas, finally even the light areas becoming dark also. Ducks are usually so far away from the observer that their colors can only be expressed in terms of dark and light. Color markings consequently reduce themselves to

color patterns, namely, the arrangement of dark and light areas for any given species. The Black Duck, for instance, is not really black at all, but appears so only a few yards away. White, unless in very small quantities, is evident at very great distances. Red and blue soon appear black. Light grays and blues appear as light areas. Yellow or buffy tints soon change to brown. Brown in strong sunlight can be distinguished from black up to a quarter of a mile, finally appearing black. With practice the color pattern of every species is easily determinable beforehand for various distances.

So much for the general lines along which these field studies of the Anatidae have been conducted. Every means to identification which the student can employ will be described. The majority of species possess several characters each, so that if conditions make the determination of one impossible, there are others equally good upon which to rely. Unless a duck is so near that every color marking can be made out, the student is advised to flush or scare up his bird if possible, as most of the characters other than color markings show in flight only. Ducks sitting on the water 100 yards from shore are almost invariably unidentifiable on a dull day. If, however, they can be made to fly away they are equally certain to leave their names behind.

It should be understood that when characters are given for any species when on the wing, the line of flight must be past the observer not away from or toward him. Certain expressions with regard to distance have been found convenient, and are employed consistently through the paper. They are as follows: "close range," from 10–150 yards; "short distance," same as the preceding; "moderate distance," 150 yards to one quarter of a mile for geese and swans; "long range," one quarter of a mile or more. The use of prism binocular glasses is taken for granted throughout the paper.

These investigations were started originally to find out how far the accurate identification of *Anatidae* could be carried, not to prove that they could be named much more easily than supposed.

II. DESCRIPTIVE.

The Anatidae of North America are divided into five subfamilies according to the 'Check-List' of the American Ornithologists' Union, a division based naturally upon structural differences. Fortunately there are characteristics of shape, size, and color which readily distinguish most of these groups in the field. The differences between the *Anatinae* and the *Fuligulinae* are comparatively slight, several species in each group varying towards the other in some of their characters.

FIELD KEY TO THE SUBFAMILIES.

A. Plumage pure white; head and neck ½ total length; wings very long and broad; size very large, length 55 inches.....*Cygninae.*

AA. Plumage never entirely white, neck ⅓ of total length or less; length under 43 inches.

a. Wing-beats slow; wings very broad; neck ⅓ of total length; size comparatively large..... *Anserinae.*

b. Wing-beats more rapid; wings not broad; neck not of striking length (except in Pintail); size comparatively small.

1. Bill, head, neck, and body held in a straight line in flight; bill long, narrow and slender; head, neck, and body very slender.....*Merginae.*

2. Bill, head, neck and body not held in a straight line in flight; bill short and comparatively stout; shape not so slender as the last.

a. Neck long; head narrow; body slender; wings narrow and tapering gradually to a point.....*Anatinae.*

b. Neck usually short and always stout; head stout and round; body stout; wings broad and suddenly pointed or else rounded; wing-beats much more rapid than in last.....*Fuligulinae.*

SUBFAMILY MERGINAE.

Three species of Mergansers occur more or less commonly in the Eastern United States. In the water at close range they can always be recognized by the narrow slender bill, and slender head and neck. In flight these characteristics are even more apparent; moreover the bird holds itself with the bill, head, neck, and body in a straight line. The flocking formation of Mergansers is also characteristic. They fly in long lines over the water; regularly, in single file. In flocks containing fifty or more birds,

there is a certain amount of bunching in the middle, but the flock is always longer than broad or deep. Mergansers fly as a rule just above the water. I have never seen a Merganser more than 150 feet in the air. Their flight and flocking habits are shared by the Scoters only, which are mostly black, while the Mergansers always show a considerable amount of white in the plumage. Finally Scoters are not nearly so slender in build as Mergansers. Members of this subfamily can be made out satisfactorily at a distance of a quarter mile or even more.

1. **Mergus americanus.** AMERICAN MERGANSER.
2. **M. serrator.** RED-BREASTED MERGANSER.

These two species can best be discussed together. Color markings alone must be used to distinguish them, as the difference in size is not sufficient. The males are readily separable. The crest of the Red-breasted is noticeable at a considerable distance even in poor light. The reddish-brown band across the breast shows even when the bird is swimming, being well above its "waterline." At any distance or in poor light it appears merely as a dark area, but as the male American never has a dark area below, this mark is useful in the field at all times. On the wing the Red-breasted shows much less white than its relative, because the bend of the wing and the outer scapulars are almost entirely black, whereas they are pure white in the American. This character is the one observable at the greatest distance. The females of the two species are very difficult to separate. The American has a dark reddish brown head and neck sharply defined from the gray or white of the adjoining areas. In the other species the reddish brown is lighter in shade and blends gradually into the adjacent areas.

A good many students are content to separate the two species by the character of the water in which the bird is found. Incredible as this may seem, there is a certain basis of truth in it, founded on the habits of these birds. The American undoubtedly prefers fresh water, rivers and lakes; the Red-breasted the ocean, and salt bays, and estuaries. Unfortunately many exceptions may possibly prove the rule, the Red-breasted Merganser being a regular migrant to all large inland bodies of water, and the American frequently noted in bays and estuaries, though rarely in the ocean itself. The student must realize then that a Merganser on a river or lake is not necessarily an American, and similarly a flock of birds in some bay are not necessarily to be considered the Red-breasted species.

3. **Lophodytes cucullatus.**—HOODED MERGANSER.

This rather uncommon species is found in all types of aquatic environment, and hence associates frequently with its larger relatives. On such occasions its much smaller size and the darker coloration of both sexes readily distinguish it. Should the birds be alone on some quiet mill-pond

or estuary, the adult male can be identified by its bushy, black and white crest, the large amount of black in the wings, and the two bars of black on the sides of the breast in front of the wing. The female and immature have the back dark grayish-brown and not gray as in the other two species, a distinction which distance accentuates; the head is also dark grayish-brown and not reddish-brown in marked contrast to the head. In rapid flight the exact proportion of light and dark does not show well, but the male differs from its relatives in the wholly black appearance of the wing. which has a small white mirror only; the female can only be identified by its smaller size.

SUBFAMILY ANATINAE.

Eleven species of this subfamily occur more or less regularly in the eastern United States, but only one, the Black Duck, is abundant and generally distributed. Most of them are now uncommon in most of the North-east. Three are rare everywhere; the European Widgeon while a rare visitor to North America, is likely to occur anywhere with Baldpate in localities suited to that species; the Shoveller and Gadwall are western species, regular winter visitors to the Southern States only, and very rare north of Maryland, along the Atlantic Coast. The Wood Duck, owing to persistent persecution and the reclamation of its breeding grounds, is now common only in the South. In the Montezuma Marshes of central New York one Teal is seen for every thousand, twenty-five years ago. Several years are usually required to meet all the members of this subfamily, unless the student can reach a few chosen localities.

Most of the species can, however, be recognized at considerable distances by marked characteristics of shape and flight. The bill is relatively longer than in Sea Ducks, deeper and much broader than in Mergansers. The neck is slender, never stout, and from $\frac{1}{3}$ to $\frac{1}{4}$ the total length, when outstretched in flight. The Scoters (Sea Ducks) have rather slender heads and long necks, but the neck is much stouter, as is also the body, which is slender in the *Anatinae*. The wings are long, narrow and sharply pointed, never rounded and abrupt. In flight the members of this subfamily never assume an attitude like that of the Mergansers, but rather one in which the neck is inclined upwards from the body, and the head slightly downward thus forming an angle with the neck. The wing-beats are slow compared with Sea Ducks, the wing-arc

being very long. The Mallard and Black Duck are two exceptions. In these the wing-arc is short due to the rapid wing-beats, but the wings are raised high above the body during the up-stroke, thus differing markedly from Sea Ducks. All *Anatinae* rise from the water very abruptly or steeply, at an angle of 75–80°.

4. **Anas platyrhynchos.**—MALLARD.

The male Mallard at close range can be confused with no other species, whether sitting on the water or on the wing. When flying directly away from the observer, the white tail feathers and black tail coverts are very conspicuous and furnish an excellent distinguishing mark. The female Mallard most closely resembles the Black Duck but is of a light chocolate brown, instead of dark blackish brown, with a conspicuous white stripe in the wing. These characters can frequently be made out at the distance of a quarter mile in strong sunlight.

On the wing this species and the Black Duck share the peculiar wing-arc described above. At long range the white underparts of the male show as a light area even in poor light, and the paler coloration of the female is very noticeable, as mentioned above. The female also bears a superficial resemblance to the female Baldpate, many students believing that the white belly of the latter must be made out to distinguish the two species. As a matter of fact there is much more white in the wing of the Baldpate, and at any distance the peculiar flight of the Mallard is noticeable. Moreover it has a much stockier build.

5. **Anas rubripes.**—BLACK DUCK.

The Black Duck, owing to its uniform dark coloration and peculiar flight, is distinguishable at any distance. The white lining of the wings is an excellent character which is obvious at a distance of a quarter mile in good light. The thin line of white on the tips of the secondaries is not visible for more than a hundred feet, and is indistinguishable when the bird is on the wing. There is, therefore, no danger of confusing it with a female Mallard, which has a conspicuous stripe of white in the wing.

When Black Ducks are startled by a sudden approach or when in some manner suspicion is aroused, the head and neck are stretched straight up in the air to the fullest possible extent, and the bird for several seconds is absolutely motionless. All Anatinae, when alarmed, raise the head to look about, but no other species comports itself in quite the same way as the Black Duck.

Encamped on the bank of a pond in some marsh during the migrations, the student is often awakened by the whirring of wings, the quacking and whistling of various Anatinae which appear as mere shapeless shadows. Their notes identify them. The male Mallard and Black Duck have a low reedy quack, *kwek-kwek-kwek-kwek*, given much more rapidly than the resonant *quack, quack, quack*, of the females.

6. **Anas fulvigula.**—FLORIDA DUCK.

This species is easily distinguishable from the Black Duck in life. The lack of streaks on the buffy throat gives this part a much lighter appearance at a distance than the rest of the underparts or the head, thus affording a contrast in color pattern which is noticeable in a good light at a considerable distance. The two races of this species are, of course, not distinguishable in life.

7. **Chaulelasmus streperus.**—GADWALL.

This species is the rarest of its subfamily in the North-east, and I doubt if it is really common anywhere in Eastern North America east of the Mississippi. The male is quite unmistakable at close range. At a distance it has a gray effect, the wing with a large white and dark area. The female is the most difficult of its subfamily to identify. The color pattern is precisely like that of the Baldpate. At close range the absence of a vinaceous tone is obvious. At a distance in flight this distinction becomes impossible, and it can then be distinguished only by its shape, which is like that of a Pintail, slenderer and more rakish. The conspicuous white in the wing will distinguish it from the latter. In most parts of the Eastern United States it should be identified with the greatest care and caution.

8. **Mareca penelope.**—EUROPEAN WIDGEON.

This beautiful species is by no means so rare as was formerly supposed in the Eastern United States. On Currituck Sound, North Carolina, where Baldpates winter in great numbers, this species is well known to the better class of local gunners who call it the Red-headed Widgeon. It is likely to occur wherever Baldpates are particularly abundant.

In size, shape, and flight characters it closely resembles its relative, and is indistinguishable from it on the wing at any distance. At close range on the water, however, the male differs from any other species in its cinnamon red head and cream buff crown. The female is indistinguishable in the field from the female Baldpate.

9. **Mareca americana.**—BALDPATE.

Like all the members of this subfamily, the male Baldpate is unmistakable at close range. The female resembles that sex of the Mallard, but is much paler in general color and smaller. The amount of white in the wing is also much greater. When tipping for food Baldpates leave only the rear end out of the water. On such occasions the pure white of the belly is sharply contrasted with the black under tail-coverts, a very striking field mark.

On the wing even at close range the white top of the head in the male is usually invisible and the thick speckling of black elsewhere on the head give it a dark appearance. The whole fore-part of the wing is, however, snowy white and very conspicuous, this mark alone serving to distinguish it from any other member of the family. The body is much paler in coloration than the Mallard and is strongly vinaceous in tint.

The lower breast and belly are white. The last two characters serve also to distinguish the female very readily.

On the wing at long range this species is readily determinable by its shape which is noticeably slenderer than the Mallard and Black Duck. This shows especially in the body which is not so deep or so stout. The flight is also diagnostic, the wings being brought way below the body in the down-stroke, thus making the wing-arc a long one. The bird seems to rise from the water, when flushed, with much less effort than the other two species.

The note of the male is a mewing whistle which might be rendered as *whew, whew, whew.* More rarely there is another note, a *fi-éw,-whew,* with a pronounced burr in it, making it suggest a common call note of the Pine Siskin to a surprising extent. The female utters a loud cry which Eaton renders *kaow, kaow.* Unlike the Black Duck, the female is not particularly loquacious, while the drake gabbles incessantly. The Baldpate is easily the tamest of the Anatinae.

10. **Nettion crecca.**—EUROPEAN TEAL.

At close range in good light the male can be separated without difficulty from our Green-winged Teal. While well acquainted with both birds in life, this species is so rare in North America that I would not regard a sight record as of any real scientific value.

11. **Nettion carolinense.**—GREEN-WINGED TEAL.

The male Green-winged Teal at close range is unmistakable because of its small size; chestnut colored head; white crescent in front of the wing, and absence of white in the wing. The female is more or less uniformly colored, a paler shade than the male Mallard, and no white in the wing.

In flight, at any distance, this species is easily determined by its very small size, 3–5 inches smaller than the Baldpate for instance. The flight is also exceedingly rapid, equalled by the Canvasback alone, and it is remarkable how the great speed is attained and maintained without apparent effort, while the Canvasback displays effort in its movements.

The male utters a short mellow whistle, somewhat like the first syllable of a Baldpate's note. The female quacks like a Black Duck but the notes are higher pitched, more often repeated and much less strident. Neither sex is particularly loquacious.

12. **Querquedula discors.**—BLUE-WINGED TEAL.

The male is easily recognized at close range by the crescentic patch of white in front of the eye, and both sexes by their small size and grayish blue wing-coverts, which at a distance seem to occupy about a third of the wing. This species is obviously a Teal by its small size, although it is a trifle larger than its relative.

At long distance in flight when color details are lost, the white crescentic patch of the male is invisible, and it then appears to all intents and purposes like the female. Under these circumstances it can be confused with the female Shoveller and the Green-winged Teal. The grayish-blue

wing coverts are conspicuous as a light area at a considerable distance, which serves to eliminate the uniformly brown Green-winged Teal. The Shoveller also has grayish-blue wing-coverts, but its bill is over 2½ inches long, longer than any member of the family in this continent except the Swans, the bill of the Teal but little over an inch long.

The flight of this species is fully as rapid as its near relative. Both species drop suddenly into the water like Snipe, and frequently wheel about over the marsh in an erratic manner in a densely massed company like Sandpipers.

The male's note is a whistling "*peep,*" repeated five or six times. The female quacks less plainly and in a hoarser voice than the Green-wing. The notes are seldom heard.

13. **Spatula clypeata.**—SHOVELLER.

The Shoveller is still a very rare bird in the North-east, but is not uncommon in parts of the South and the Mississippi Valley.

The drake is an absolutely unmistakable bird, even at long range. In shape and size it looks like a Blue-winged Teal with a tremendously long bill, which gives the wings an effect of being way to the rear. The color pattern is unmistakable. Below there are 5 alternating areas of dark and light. The head looks black; from there to the front edge of the wing is an area of pure white, which appears like a broad ring around the body; the chestnut abdomen appears as a dark area, separated from the black under tail-coverts by a narrow band of pure white. At a great distance this narrow white band becomes invisible. If the upper-parts are seen, the back is dark, the white ring appears continuous, and the whole front half of the wing is pure white. The female has already been discussed.

Shovellers, while resembling Teal in shape and appearance, do not resemble them in speed of flight or other flight characteristics. In a large mixed flock of Anatinae the Shoveller will be at the top level of the flock, Teal will be at the bottom level towards the rear, and are the first to break away and dart back to the marsh. Teal will frequently not flush at all when surprised, but stretching the head and neck over the water will creep among the reeds along the bank and are astonishingly hard to detect. I have never known the Shoveller to attempt this. In fact, as a rule, most Anatinae will flush, even when invisible to the hunter in a canoe, and will rise to almost certain death above the shelter of the reeds.

14. **Dafila acuta.**—PINTAIL.

The male at close range is readily determined by the long tail feathers and a narrow line of white running up the sides of the neck between the bronzy brown of the sides of the head and the back of the neck. Both sexes at any distance can be determined by the length of their necks which are proportionately almost as long as in Geese. The female is more or less uniformly colored, about the same shade as a Mallard but without any white in the wing.

In flight this species can be distinguished at any distance by shape alone. The female is about as long as a Black Duck and the male considerably longer, though at any distance the long tail-feathers become invisible making it appear but little longer than the female. The long slender neck and slender body are, therefore, very striking. Compared with a Black Duck, the body is much narrower and less deep. The wings are also much narrower at the base than any other fresh water species. The flight resembles that of the Baldpate.

The female has a hoarse, guttural quack, the male a mellow, piping whistle like the syllables *whee, ee, ee, ee,* very rapidly uttered.

15. **Aix sponsa.**—WOOD DUCK.

The beautiful plumage of the male Wood Duck is unique, and unexcelled by any other North American species. On the wing the brilliancy of the colors is lost. The head is ornamented with a long crest, however, and there are conspicuous white markings on the sides of the head and neck, and a broad crescent of white in front of the wing. The female has a noticeable crest, is dark brown in general color, and resembles a female Baldpate in general appearance. The chin, is however, pure white, and there is a conspicuous white eye-ring. There is also very much less white in the wing.

In flight at any distance a stray female Wood Duck mixed in with other species could not be distinguished with certainty. It prefers wooded swamps and flooded lands, however, where the other species of Anatinae rarely occur. The Wood Duck is rarely seen in the marshes or on large bodies of water. It is perfectly at home in the woods, darting through the trees at top speed ,and frequently alighting on branches and stumps, a habit shared by no other species.

The commonest note of the male is a *hoo-éek-hoo-éek,* given when alarmed. It also, according to Eaton, has a mellow *peet, peet.* The call of the duck closely resembles her mate's.

American Museum of Natural History, New York.

(To be concluded)

THE WINTER BIRDS OF THE BILOXI, MISSISSIPPI, REGION.

BY JULIAN D. CORRINGTON.

HAVING occasion to spend the latter half of the winter of 1920–1921 on the Gulf Coast, I took the opportunity of making a study of the fauna, and particularly the birds of Biloxi, Mississippi, and its environs, and found this territory to be a vertible paradise for winter birds of all groups.

A second trip was made to Biloxi for the last nine days of December, 1921, and additional observations made at that time.

Concerning Biloxi. This region is a part of the American Riviera, which extends from New Orleans to Mobile, and which is fast becoming a popular "all-the-year-round" resort. The coast line is dotted with mansions and cottages and a line of watering places, the principal ones being from west to east, Bay St. Louis, Pass Christian, Gulfport, Biloxi, Ocean Springs, and Pascagoula. These cities are all in the State of Mississippi, and face the Mississippi Sound, a shallow body of water partially separated from the main Gulf by a chain of long and narrow islands, lying on an average of nine miles from shore. This country is served by the Louisville and Nashville Railroad, the Gulf and Ship Island Railroad, in part by an electric interurban line, and by fine shell roads.

Biloxi is situated on a long thin peninsula, washed by the Mississippi Sound on the south and the Biloxi Back Bay on the north. The chief industry is that of the sea,—fishing of all kinds, but principally the canning and exporting of oysters and shrimp. The immediate back country is not suitable for agriculture of a general nature, as nearly fifty per cent of the land is made up of small marshes and wooded swamps for a considerable distance inland. However, the orange and pecan groves flourish, and do well on reclaimed soil.

Acknowledgenments. The writer met with unfailing kindness and courtesy from many friends made in Biloxi, and wishes to especially recognize here the assistance rendered by Mr. John Hord, who made the more distant trips to Ship Island and the Pascagoula Swamp possible with his power boat and car, and who aided in many ways, among which was the satisfactory establishment of the presence of certain species not seen by the author. Thanks are also due Dr. A. A. Allen of the Zoological Department, of Cornell University, for helpful criticism of the manuscript.

Previous Publication. During the four day period of February 13–16, 1904, Messrs. H. H. Kopman, W. B. Allison, and Andrew Allison made observations in the vicinity of Bay St. Louis, the western-most of the Riviera resorts. This city is the county seat of Hancock County, and since this is the only one of the three coastal counties not covered in my own studies, I have decided to include

these records in the present writing. The younger generation of readers may not be familiar with Mr. Allison's paper, and then too, it is well to have the winter avifauna of the three adjacent counties incorporated in a single article. This report* includes 61 species, and is the only published record to my knowledge of this interesting region.

The territory embraced in the following records is by no means uniform in its faunal distribution, and for the purposes of this paper I have divided it into seven localities, designated by the letters A to G.

Locality A is bounded on the east and west by the cities of Biloxi and Gulfport, and on the north and south by Back Bay and Mississippi Sound respectively. Throughout it is heavily wooded with deciduous trees, with but scatterings of pines, which accounts for the absence or scarcity here of the typical birds of the great southern pineries. There are occasional small wooded swamps and innumerable small marshes, fresh water on the north, salt water on the south. A goodly number of farms and clearings occur, but field frequenting birds are rare. Several places in this area were especially good for bird study, notably the Biloxi Cemetery, the Confederate Soldiers' Home at Beauvoir, the Camp Ground, Heartsease, Handsboro, and the Golf Links. At Gulfport, a long pier runs out from the Great Southern Hotel grounds to the beach, crossing over a good sized salt marsh. This proved an especially fertile field for marsh birds, as one could look directly down upon them and observe with ease, though on descending to the ground he would be able to see little or nothing because of the dense and high growth. Much was accomplished here without the use of a blind.

Locality B includes the towns of Ocean Springs and Seymour, the latter being a cross-the-bay extension of Biloxi. The character of the land is quite different, and even in places where one might throw a stone across, the change from locality A to B is very noticeable. Deciduous woods are present but are greatly overshadowed by the pines, and large fields of various kinds occur,

* Allison, Andrew: Notes on the Winter Birds of Hancock County, Mississippi. Auk, XXIII, 1906, No. 1, pp. 44–47.

with apparently more successful and attractive farming. Marshes are much scarcer but there are several fair-sized swamps. As a consequence of these differences, the bird life of the two regions presents many contrasts. Meriting especial mention for field work are the vicinities of Seymour and Woolmarket.

Locality C, Deer Island, is a more compact unit as would be expected, and was one of the finest spots for bird study, particularly for groups lower than the Passeres, in the entire region. Pine groves clothe the eastern and western ends, and the shores everywhere teem with life. The bulk of the interior consists of one great marsh, well enough isolated from civilization to retain a primitive wildness, and was indeed a treasure house of marsh forms.

Locality D, Ship Island, is similar but not as good. Only the eastern tip, from the lagoon east bears any vegetation, and consists of pine groves and marshes. The remainder of the island is a long and narrow spit of bare sand.

Locality E is the Mississippi Sound portion of the region visited.

Locality F, the Biloxi Back Bay, is salt water for only a short distance inland, and was well supplied with bird life in spite of the constant traffic. The long bridge across to Seymour furnished good hunting with the field glasses.

Locality G embraces the great Pascagoula Swamp, a compact unit, and one well deserving of a separate volume. On two successive days my friend, Mr. Hord, took me out by automobile to points beyond Vancleave whence we paddled in a dugout through miles of veritable fairyland, covering different routes each time. An uncharted wilderness, this vast swamp consists of a maze of interlacing bayous and lakes in which the unacquainted would be speedily lost. The land areas, much of which were under water at the time of our visit, are heavily timbered but without the tangle of undergrowth one might expect, and the water everywhere was completely free from debris, never stagnant, and entirely fit to drink, In the bayous, all of which connect up with the large central Pascagoula River and its branches, the water averaged some fifty feet in depth and afforded wonderful fishing. We saw alligators and swarms of turtles, but very few snakes indeed. Mr. Hord told me that the razorbacks which run wild in the swamp keep them killed off. Hunting parties from Biloxi, Gulf-

port, and other points find the shooting exceptionally good here, the bags of Wild Turkeys running from ten to twenty for a two or three day trip of several persons, with a few deer and even an occasional bear. With limited time, we could not penetrate deeply enough into the swamp to find such game, but my ornithological zeal was satisfied by the sight of an Ivory-billed Woodpecker, a bird so near extinction that I had never hoped to see a living specimen.

Ecological Associations. Zoologically, the region lies in the Austroriparian Zone, and the characteristic species of this belt are well represented. In the following synopsis of the forms recorded it will be of value to note the ecological associations in which each typically occurs, together with those which it may invade. These environments are given as I found them to be for this particular region and for the winter only, and have no connection with the possible haunts of the birds at other places and seasons. No attempt was made in this study to work up the flora systematically, and of animals only the birds are given, as other forms lie without the scope of this publication. Thus simplified, I have listed the Associations under ten headings, as follows:

1. The Open Water Association, consisting here of localities E and F The flora includes the usual seaweeds of the shallows.

2. The Littoral Association, practically without vegetation and including all shore lines, tidal flats, bars, and the water bordering them for a distance of fifty feet outward.

3. The Marsh Association, involving fresh, brackish, and salt water marshes and made up principally of sedges, rushes, and cat-tails.

4. The Swamp Association, composed of small swamps in scattered places particularly in the various river bottoms, but reaching its full development only in the magnificent Pascagoula Swamp. Here the flora includes live oaks, cypress, sweet gum, tupelo gum, spruce-pine, and some scrub palmetto in the drier places.

5. The River Association. Fresh water streams in themselves form an environment characteristic of a few species and must be listed separately. Practically all of the other associations descend

to the very banks of the rivers, but the birds listed under this head are typical of the river and not of the surroundings. The Water-lily is the most frequent plant.

6. The Field Association. Under this general term are included such diverse habitats as wet meadows, dry upland fields, thickets, and the very numerous areas of scrub palmetto.

7. The Deciduous Woods Association. The characteristic tree all over this region is the live oak, which grows everywhere, from the beaches to the distant swamps. Many other oaks are in evidence, and there are lesser growths of magnolias, sycamores, hickories, etc.

8. The Coniferous Woods Association. Various evergreens are found, but the long-leafed yellow pine is the most abundant. This is a very compact association, many of the typical forms occurring nowhere else.

9. The Universal Association. An artificial group created to take care of some of the most widespread forms,—those which are encountered wherever one may go, be it beach, swamp, or dense pinery, and which are apparently equally at home in any environment.

10. The Social Association. Another artificial category, and including those species which are only to be met with in the immediate vicinity of dwellings, whether of town or farm.

Description of Field Studies. The record covers a period of 78 days, from January 13 to March 31, inclusive, during which time there were 26 days on which regular field trips were made for the express purpose of faunal study. Of these, 9 were taken in January, 10 in February, and 7 in March. Again, of the 26, 13 trips were made in Locality A, 8 in Locality B, 2 to C, 1 to D, and 2 to G. Localities E and F were studied in connection with many of the above trips, and were noted casually every day. In addition to the 26, cursory observations for a brief period to nearby points were made on 9 additional days.

On my second visit to Biloxi, covering the dates of December 23 to December 31, 1921, several cursory records were added, and two field trips made, one up the Biloxi River by boat, and one to the Pascagoula Swamp.

Hypothetical List. A number of species should be at least occasionally met with in this region in the winter that I did not find, and for whose presence I could not establish satisfactory evidence from local sources. Also it is well to call attention to the fact that certain groups are more fully represented in number of species in this region than the synopsis would indicate.

The Water Turkey (*Anhinga anhinga*) proved the most elusive of all. Many times I responded to calls to "come and see the Water Turkey," and many persons pointed a would-be specimen out to me, but in each case the bird in question turned out to be a Cormorant. I looked for them in all of the most suitable situations, especially inland on the rivers, but never found one.

Reports were both numerous and credible from fishermen, hunters, and from sailors stationed at the Gulfport Naval Training Station, of large mixed flocks of Ducks and Geese of many different species to be met with on the open Gulf beyond the chain of islands. Unable to go out there, I had to be contented with the small flocks and strays seen along the coast, and my list of Anseres is unquestionably very incomplete.

The Sandhill Crane (*Grus mexicana*) was another form of reported common occurrence but each bird observed proved, as might be expected, to be a Great Blue Heron.

The list of Rails is undoubtedly deficient, and both species of Gallinules should also occur in this fauna. The difficulties always attending the study of this group were intensified here by the dense and high growth in all the marshes, and by lack of time and opportunity to use a blind.

Shore-birds are certainly more numerous in species than my list would indicate, but are of erratic distribution locally as well as generally. More trips to the islands would probably have swelled my number of Limicolae considerably. I believe I saw some Semipalmated Sandpipers (*Ereunetes pusillus*) on Deer Island, but could not approach closely enough to make certain.

I expected to encounter the Ground Dove (*Chaemepelia passerina terrestris*) but could not find it or uncover any reliable records of its presence here. The same is true of the Osprey (*Pandion haliaëtus carolinensis*). A reward was offered anyone who could show me a Barn Owl (*Aluco pratincola*) but it remained unpaid.

No traces were found of Screech Owls, the Whip-poor-will, Purple Finch, Red-breasted Nuthatch, and others of anticipated winter occurrence.

Regarding the Pine Siskin (*Spinus pinus pinus*) there is some evidence but no proof. Allison's paper brackets this species with a question-sign and the remark: "Doubtful. A flock of supposed Siskins seen." Several persons in Biloxi also told me they are fairly sure of having seen Siskins during several winters.

Subspecies and Geographic Races. The ultimate analysis of certain forms was not determined, as I had no opportunity for general collecting or the preparation of skins, and the identification of the forms listed below cannot with certainty be made in the field. Also I question the value of going around shooting Meadowlarks, for example, just to see if the form present is the Meadowlark (*Sturnella magna magna*) or the Southern Meadowlark (*Sturnella magna argutula*) or if both occur. I did take one Grackle and found it to be the Florida Grackle (*Quiscalus quiscula aglaeus*) but the Bronzed Grackle (*Q. q. aeneus*) is very probably found here in the winter also.

The following forms are listed in the synopsis under the binomial term only, though it is practically certain that both the migratory and resident forms are intermingled all through this part of the South in the winter.

Migrant Race.	Resident Race.
Double-crested Cormorant	Florida Cormorant
Phalacrocorax auritus auritus	*Phalacrocorax auritus floridanus*
Great Blue Heron	Ward's Heron
Ardea herodias herodias	*Ardea herodias wardi*
Northern Flicker	Flicker
Colaptes auratus luteus	*Colaptes auratus auratus*
Meadowlark	Southern Meadowlark
Sturnella magna magna	*Sturnella magna argutula*
Migrant Shrike	Loggerhead Shrike
Lanius ludovicianus migrans	*Lanius ludovicianus ludovicianus*
Maryland Yellow-throat	Florida Yellow-throat
Geothlypis trichas trichas	*Geothlypis trichas ignota*
Robin	Southern Robin
Planesticus migratorius migratorius	*Planesticus migratorius achrusterus*

Synopsis of Species: The arrangement adopted for presenting the data of the synopsis is as follows:

First paragraph consists of statistical matter, made as concise as possible and arranged in the following order:

1. Status of species as a winter visitant or resident of this region.
2. Localities in which the species was found.
3. Typical ecological association in which the species occurs here in the winter, together with those which it may invade.
4. If the species is recorded in Allison's paper, the notation "Allison, common," "Allison, a few," etc., follows, giving the status as he found it in the Bay St. Louis district.

Remarks of a general or particular nature on phases of distribution, associations, notes, or unusual behavior are given in a second paragraph.

The nomenclature follows the A. O. U. Check-List of 1910 and subsequent supplement.

Of the 112 species listed, 96 were recorded by the present writer of which 54 were also noted by Allison, 7 additional forms were observed by Allison which I did not find, 4 more are mentioned in other papers by Allison, 2 rest on the reliable authority of Mr. Hord, and a final 3 were striking birds, impossible of confusion by the veriest amateur, and reported by numerous residents of Biloxi in such a manner that I am satisfied of the propriety of their inclusion in this list.

1. **Colymbus auritus.** HORNED GREBE.—Rare. Locality E. Littoral Association.

Throughout my first visit, none of these birds were seen, but on December 25, 1921, a very tame individual spent the day close to the shore at the Biloxi Yacht Club Pavilion, and was not frightened away by passing traffic.

2. **Podilymbus podiceps.** PIED-BILLED GREBE.—Common. Localities D, E, and F. Littoral Association, invades Open Water and River. Allison, 2.

Found in small flocks of three and four individuals, either quite tame and frequenting shore lines of busy waters, or farther out in company with Ducks.

3. **Gavia immer.** LOON.—Common. Locality E. Open Water Association, invades Littoral.

Occurred singly or in groups of from two to four. Were not unduly wary and did not mingle with other birds. Last seen April 4.

4. **Larus argentatus.** HERRING GULL.—Abundant. Localities E, and F along all shores. Littoral Association, invades Social along waterfront. Allison, common.

The majority of all specimens observed were immature birds. They could be seen at all times about the fishing docks and factories, but were much less in evidence along the residential beach. Last seen March 27.

5. **Larus delawarensis.** RING-BILLED GULL.—Abundant. Localities E and F along all shores. Littoral Association, invades Social on waterfront. Allison, common.

This was the most abundant Gull of any, and was more often met with along the residential than on the commercial beaches. Not observed after April 6.

6. **Larus atricilla.** LAUGHING GULL.—Allison states a few were seen by his party, but I did not record this species.

7. **Larus philadelphia.** BONAPARTE'S GULL.—Common. Localities E and F along all shores. Littoral Association, invades Social along waterfront.

This Gull was much less in evidence than others and like the Ring-billed, preferred the residential beach. All of the Gulls mingled considerably but while this species was often observed in company with the Ring-bills, it was seldom seen with Herring Gulls. Last recorded March 21.

8. **Sterna maxima.** ROYAL TERN.—Common. Localities E and F along the shores and bars. Littoral Association, invades Social on waterfront, but much less frequently than Gulls.

These birds were seen resting on sand-bars in company with Gulls, Skimmers and Limicolae, and were frequently noted singly while fishing. I did not identify any Caspian Terns, *Sterna caspia*, but judge that they too are found in this region as they winter on the Gulf Coast in many places. Allison records them on the Louisiana Coast not far distant,* but I do not give them a separate rating in this list, as I can find no definite data of their occurrence in this Biloxi region.

9. **Rynchops nigra.** BLACK SKIMMER.—Common. Locality E along shores of A and C. Littoral Association.

Skimmers were always seen in large flocks of from 75 to 100 individuals, and were most commonly found resting on the bars with Gulls, Terns, etc., and did not seem especially afraid. In fact, one flock approached a small skiff I was in with apparent curiosity, and as I made no movement, soon fell to feeding in their peculiar manner all about the boat, uttering their hound-like barkings. A certain flock roosted on the western spit of Deer Island and could be seen going out over the Gulf in the morning to points unknown, and returning about sundown. They flew swiftly, in very compact formation, and just barely above the surface of the water,

* Beyer, A. Allison, and Kopman: List of the Birds of Louisiana, Part III, Auk, Vol. XXIV, 1907, no. 3, p. 315.

keeping a perfect unison in the wing-beats. They did not feed en route during this daily journey.

10. **Phalacrocorax auritus.** DOUBLE-CRESTED CORMORANT.—Abundant. Localities E and F, near shores, and G. Littoral Association, invades Open Water, Swamp, and River.

One flock of 25 of these birds apparently roosted on or near the southern shore of Black Bay, as they were several times disturbed and seen to swim out from shore in the early morning. In a short while this flock would disperse and I never met such large groups after seven A. M. Cormorants were a common sight, though, at all times of the day perched singly on every buoy and beacon in the various harbors, and would suffer a close approach from passing boats. Individuals were also seen farther out in the Gulf, fishing from the surface of the water.

11. **Pelecanus erythrorhynchos.** WHITE PELICAN.—Uncommon. Open Water Association.

Not recorded by the writer. Reported to be occasionally met with in the open Gulf beyond the chain of islands, by fishermen, sportsmen, and others, who furnished accurate descriptions of appearance and feeding habits.

12. **Pelecanus occidentalis.** BROWN PELICAN.—Faily common. Locality E, near shores of A and D. Open Water Association, invades Littoral.

Seen fishing singly or by twos or threes. Occasionally noted perched in grotesque fashion on piles, once in company with Great Blue Herons. They fly with great ease and buoyancy for so heavy and clumsy looking birds, with more sailing than flapping, and when diving for fish do so precipitately and with a great splash that can be seen and heard half a mile or more.

13. **Fregata aquila.** MAN-O'-WAR BIRD.—Uncommon. Locality E, and beyond the chain of islands. Open Water Association.

I saw none of these unique birds myself, but they were reliably reported by fishermen and sportsmen.

14. **Mergus serrator.** RED-BREASTED MERGANSER.—Common. Localities E and F, near shores of A, C, and D. Open Water Association, invades Littoral.

Next to the Lesser Scaup this Duck was the tamest of any and suffered close approach by boat even during the shooting season. They were most commonly seen, in fact, where the bay traffic was the heaviest.

15. **Anas rubripes**(?). BLACK DUCK.—Uncommon. Locality E, near A. Open Water Association, invades Littoral.

I am not aware that this species has been recorded heretofore as wintering on the Gulf Coast, and so hesitate to make the diagnosis positive. Their winter range does include southern Louisiana, so that it seems quite likely that occasional specimens should be met within the territory covered by this paper. However, the Mottled Duck (*A. fulvigula maculosa*) could

also occur here with equal reason, and the two forms cannot with certainty be distinguished in the field, unless under exceptionally favorable circumstances. I am of the opinion that the flock of four birds I observed on March 18 were Black Ducks.

16. **Dafila acuta.** PINTAIL.—Common. Locality E, near D. Open Water Association, invades Littoral.

The largest flock I encountered numbered 24 individuals. They were feeding along sand-bar shallows and were very tame.

17. **Marila marila.** SCAUP DUCK.—Fairly common. Locality E, near A. Open Water Association, invades Littoral.

Seen only in very small flocks, and fairly tame.

18. **Marila affinis.** LESSER SCAUP DUCK.—Common. Localities E, near A, and also in D. Open Water Association, invades Littoral and Marsh.

Toward the end of the winter these Ducks became so confiding that they would swim along the very edge of the beach front within 25 feet of passing traffic. Present only in small flocks, but considerably more numerous than the preceding. Last seen April 4.

19. **Glaucionetta clangula americana.** GOLDEN-EYE.—Fairly common. Locality F. Open Water Association, invades Littoral.

Occurred in small flocks only and in company usually with Red-breasted Mergansers.

20. **Botaurus lentiginosus.** BITTERN.—Fairly common. Locality C. Marsh Association.

Apparently solitary at this season, but not infrequently heard booming and stake-driving.

21. **Ixobrychus exilis.** LEAST BITTERN.—Fairly common. Locality C. Marsh Association.

Both species of Bitterns were found only on Deer Island by the writer, but doubtless they occur elsewhere throughout the region in suitable locations.

22. **Ardea herodias.** GREAT BLUE HERON.—Abundant. Localities C, D, and G. Swamp Association, invades Littoral, Marsh, and River. Allison, 1.

These big Herons were especially frequent and picturesquely revealed along the shores of the islands, where they would wade out a considerabe distance from land and fish among the abundant schools of small fry. Their appearance in such a place is so Crane-like that one does not wonder at the reported observations of "Sandhill Cranes."

23. **Hydranassa tricolor ruficollis.** LOUISIANA HERON.—Satisfactorily identified and reported to be fairly common by several different parties in Biloxi. One was seen right on the front beach during my stay, but it was gone before I could answer the summons, and I saw none at any time.

24. **Florida cærulea.** LITTLE BLUE HERON.—Fairly common. Locality G. Swamp Association.

I found this species only in the Pascagoula Swamp, but no doubt it occurs elsewhere here in suitable places.

25. **Rallus elegans.** KING RAIL.—Probably not very common. Locality A. Marsh Association. Allison, common but inconspicuous.

Rails were certainly present in nearly every marsh throughout the area but as before stated, were especially difficult to observe and I hesitate to remark as to their specific abundance.

26. **Porzana carolina.** SORA.—Probably fairly common. Locality A. Marsh Association.

I saw only a few individuals of the two Rails here listed, and the Sora was of course more often met with than the King Rail.

27. **Fulica americana.** COOT.—Common. Localities A and C. Marsh Association.

Seen only on Deer Island, but their loud cackling notes were heard at Gulfport and elsewhere in Locality A.

28. **Philohela minor.** WOODCOCK.—Uncommon. Locality G. Swamp Association.

I only recorded a single specimen, seen on December 31, 1921, on my second trip, but Mr. Hord reports them as seen fairly often in a region of upland thickets near the borders of the Pascagoula Swamp, beyond Vancleave.

29. **Gallinago delicata.** WILSON'S SNIPE.—Abundant. Localities A, B, C, and D, most abundant in B. Marsh Association, (borders), invades Field and Deciduous Woods.

Snipe were by far the commonest of any game bird, and could be flushed by the dozens from the wet and soft borders of both fresh and salt-water marshes. They were nearly always gregarious but did not frequent the society of other birds. One solitary individual was observed along a brook in fairly deep deciduous woods.

30. **Oxyechus vociferus.** KILLDEER.—Abundant. Localities A, B, C, and D. Littoral Association. Allison, not uncommon.

The Killdeer allowed a fairly close approach and was usually seen in small flocks of from three to six, though one flock of 20 was noted. Also they were usually in company with Semipalmated Plovers and Gulls.

31. **Charadrius semipalmatus.** SEMIPALMATED PLOVER.—Common. Localities A and C. Littoral Association. Allison, a few,—the first winter record.

Observations on this little Plover ran all the way from a few solitary birds through medium sized flocks up to one of 200. They were always associated with Killdeers, and frequently with Gulls.

32. **Arenaria intrepres morinella.** RUDDY TURNSTONE.—Fairly common. Locality C. Littoral Association.

These were seen in small flocks in company always with the two preceding species.

33. **Colinus virginianus virginianus.** BOB-WHITE.—Common. Localities A and B. Field Association.

Unlike most other species observed, Quail were not met with on the islands. The average size of a flock was five; the largest covey contained 30. At no time were they heard whistling.

34. **Meleagris gallopavo silvestris.** WILD TURKEY.—Reported as common in the Pascagoula Swamp by Mr. Hord, Dr. H. H. West of Gulfport, and others. From 10 to 20 birds are commonly secured by small hunting parties in a sojourn of two or three days in the Swamp. I was unable to visit that portion of the Swamp in which the Turkeys are most numerous, and did not find any.

35. **Zenaidura macroura carolinensis.** MOURNING DOVE.—Abundant. Localities A, B, and C. Field Association. Allison, 1.

This bird was more often flushed from roadsides and plowed fields, usually in small flocks of two to four individuals.

36. **Cathartes aura septentrionalis.** TURKEY VULTURE.—Allison reports this species as common, with the remark that the two forms of Vultures do not mix much. Strangely enough, I saw not one single Turkey Vulture during my stay in Biloxi, and am at a loss to account for this apparent absence of so typical a bird. Stockard* states that the Black Vulture is much the commoner of the two in the southern part of the State.

* See Bibliography.

37. **Coragyps urubu.** BLACK VULTURE.—Abundant. Localities A and B, most abundant in B. Field Association. Allison, common.

Vultures are said to shun the islands off Biloxi, and many were the local theories told me in explanation of this belief. I certainly saw none about the islands at any time, even Deer Island, which lies only a few hundred yards from the mainland, and this despite the fact that carcasses of both pigs and cattle were no uncommon sight on both Deer and Ship Island. This species prospects in groups, whereas the Turkey Vulture usually hunts alone. Only once did I see an individual Black Vulture soaring in solitude; the commonest number was three or four, and the largest flock noted contained 20.

38. **Circus hudsonius.** MARSH HAWK.—Fairly common. Localities C and D. Marsh Association.

As if in contrast to the preceding species, I met with Marsh Hawks only on the islands, but presumably they were present elsewhere in marshes of a size large enough to secure some degree of isolation.

39. **Accipiter velox.** SHARP-SHINNED HAWK.—Common. Localities A and B. Universal Association.

I met these little fellows in most unexpected places,—one right in the city of Gulfport,—and found them bold and aggressive and always solitary.

40. **Buteo borealis.** RED-TAILED HAWK.—Under this head Allison remarks, "A large Hawk seen at a distance must have been of this species." Though I saw three other forms of large Hawks, I met with none of this species, and would not include it on such slender evidence were it not for the fact that the Red-tail's winter range extends to the Gulf Coast in general, and such a wide ranging Hawk would certainly be found here occasionally.

41. **Buteo lineatus.** RED-SHOULDERED HAWK.—Common. Localities A and G. Swamp Association, invades Deciduous Woods.

These noisy Hawks were always seen in pairs, which fact suggests the probability that they were the resident form, the Florida Red-shouldered Hawk (*Buteo lineatus alleni*). The type race, *B. l. lineatus*, winters south to the Gulf Coast, but should not be paired at this season, as the spring migrants come north unmated.

42. **Buteo platypterus.** BROAD-WINGED HAWK.—Fairly common. Locality A. Deciduous Woods Association.

Observed to be far less wary than other Hawks, a trait for which the species is noted. One memorandum on this bird is especially unusual and interesting. Two Broad-wings were seen on April 2 in company with a Sharp-shinned Hawk, the three being flushed at close quarters from adjacent parts of the same dead tree. I was walking with a companion down a road through deciduous woods, and in plain sight we stopped to watch the Hawks. They rose above us to the level of the tree tops and began to circle and wheel about at this altitude, paying us no attention and showing no fear whatever. They seemed to be at play and reminded me of schoolboys at a game of tag. Flapping and sailing about in small circles, diving down toward or even into the tree tops and at each other, they presented a curious spectacle. The Sharp-shin seemed to have as much of a part in the sport as any, and far from objecting to the intrusion of a totally different type and species, the Broad-wings appeared to make him welcome. All three maintained silence during the whole performance, which lasted some ten minutes. Gradually the centers of the revolutions shifted, and the three Hawks drifted away over the trees and disappeared. I am certain that the Broad-wings, which at this time of the year were probably a mated pair, were not trying to drive the Sharp-shin away from a possible nesting-site or out of their sphere of the woods.

43. **Haliæetus leucocephalus leucocephalus.** BALD EAGLE.—Uncommon. Locality B. Littoral Association, invades River and Coniferous Woods.

I saw one specimen perched in a pine tree that was particularly tame. He did not take wing until I approached to within fifty feet and then flew but a short distance, again alighting in a pine. This action was repeated three times, when finally in seeming disgust, the Eagle flew high into the air and headed for the Gulf, uttering his loud cries.

44. **Falco sparverius sparverius.** SPARROW HAWK.—Abundant. Localities A, B, C, and D. Field Association. Allison, not common.

These birds were always seen singly, perched on some dead stub that commands a large field.

45. **Strix varia alleni.** FLORIDA BARRED OWL.—Fairly common. Locality G. Swamp Association. Allison, 1.

I heard a number of these noisy Owls in the Pascagoula Swamp, but did not see any.

46. **Bubo virginianus virginianus.** GREAT HORNED OWL.—Mr. Hord reports these birds to be common in the Pascagoula Swamp, but I saw none myself.

47. **Ceryle alcyon alcyon.** BELTED KINGFISHER.—Common. Localities A, B, C, D, and G. River Association, invades Littoral-Marsh, and Swamp.

While commonly seen fishing in pairs during the breeding season, I found them to be strictly solitary here in the winter.

48. **Campephilus principalis.** IVORY-BILLED WOODPECKER.—Uncommon. Locality G. Swamp Association.

After hearing of the great wildness of the Pascagoula Swamp, I had hoped to find these nearly extinct birds still holding out there, and was assured that a visit to the big Swamp would be rewarded by several views of this magnificent Woodpecker. Circumstances made it impossible for me to spend the night there, and it was necessary to start from Biloxi in the morning and return the same evening. This called for a jaunt of 80 miles by auto, and limited the time at the Swamp to such an extent that we could not penetrate to those remote and little visited portions to the north and east where the Ivory-bill as well as all the wilder and rarer game exist in greatest numbers. Nevertheless, I did see one specimen on the first visit to the Swamp, though I saw none the second trip. Both Mr. Hord and I had a splendid and satisfactory view of the bird, a large male in fine plumage. The species has been observed frequently enough by Mr. Hord, Dr. H. H. West of Gulfport, Dr. G. F. Carroll of Biloxi and others while on hunting and fishing trips so as to be listed as uncommon rather than rare.

The third trip to the Swamp, made on December 31, 1921, during the second visit to Biloxi, was uneventful as regards Ivory-bills until we were nearly ready to leave, when a large woodpecker flew across a bayou some distance in front of us. An instant later the call of presumably this same bird was heard, and while I have had no previous experience in the call of the Ivory-bill, this call was "a high, rather nasal, *yap, yap-yap*, sounding in the distance like a penny trumpet." (Chapman). From its size, the bird must have been either an Ivory-bill or Pileated Woodpecker, and the call heard was certainly not that of the latter.

49. **Dryobates villosus auduboni.** SOUTHERN HAIRY WOODPECKER.—Common. Localities A and B. Deciduous Woods Association. Allison, a few.

This form is relatively more abundant than is in *D. v. villosus* in the north. It was always solitary and unassociated.

50. **Dryobates pubescens pubescens.** SOUTHERN DOWNY WOODPECKER.—Abundant. Localities A and B. Deciduous Woods Association. Allison, uncommon.

Occurred in about the same proportion as does the northern form, *D. p. medianus*, but single and unassociated, since the factor of limited food supply which operates to bring together the Downy, Chickadee, and White-breasted Nuthatch in a northern winter is not present here.

51. **Dryobates borealis.** RED-COCKADED WOODPECKER.—Fairly common. Locality B. Coniferous Woods Association. Allison, common.

Usually seen in pairs and sometimes associated with Red-bellied Woodpeckers, Flickers, Brown-headed Nuthatches, Pine Warblers, and Bluebirds.

52. **Sphyrapicus varius varius.** YELLOW-BELLIED SAPSUCKER.—Fairly common. Localities A, B, and C. Deciduous Woods Association.

Always single, but associated with some other species of Woodpecker. Not recorded after February 25.

53. **Phlœotomus pileatus pileatus.** PILEATED WOODPECKER.—Fairly common. Localities B and G. Swamp Association, invades Deciduous Woods.

I found this big fellow only in the Pascagoula Swamp, but Miss Josie Pope of Biloxi, has seen it at Woolmarket also. The local vernacular names applied indiscriminately to this species and the Ivory-bill are interesting. The commonest term is "Lord God," said by some to be in fancied imitation of one of the call notes, but I agree with the explanation of Miss Pope that it is a corruption of "Log Cock," a designation met with in many parts of the south. The "Lord God" has in turn suffered corruptions, among them being "Good God" and "Oh My God." These deified or perhaps anathematized birds are unfortunately too often the target of the thoughtless hunter's gun in the big Swamp, and will go the way of the Ivory-bill unless better protected. In spite of such persecution I found them by no means shy.

54. **Melanerpes erythrocephalus.**—RED HEADED WOODPECKER. Abundant. Localities A, B, and G. Swamp Association, invades Deciduous Woods and Social. Allison, a few.

These Woodpeckers were so abundant in the Pascagoula and other smaller swamps that I considered the species as typically a swamp bird here at this season. Quarrelsome as ever, they were never seen actually paired or in groups, and their silence seemed strangely unnatural.

55. **Centurus carolinus.** RED-BELLIED WOODPECKER.—Abundant. Localities A, B, C, and G. Deciduous Woods Association, invades Swamp and Coniferous Woods. Allison, a few.

Unlike the preceding, this bird was never found on the streets of Biloxi or near the beaches, and was never single but always paired and noisy.

56. **Colaptes auratus.** FLICKER.—Abundant. Localities A, B, and G. Deciduous Woods Association, invades Swamp, Field, and Coniferous Woods. Allsion, common, mostly in small flocks.

In contrast with Allison's observations, I did not find Flickers in small flocks but usually singly, though almost always in company with some other Woodpecker, or Pine Warblers, Bluebirds, etc. I did not see any specimens feeding on the ground here, though ants were abundant.

57. **Sayornis phoebe.** PHOEBE.—Common. Localities A and B. River Association, invades Littoral, Swamp, and Field. Allison, common.

In song all winter and solitary. Last seen February 25.

58. **Cyanocitta cristata cristata.** BLUE JAY.—Abundant. Localities A, B, C, D, and G. Universal Association. Allison, common.

Present at all times and in all places, usually in flocks of from three to six members and always in the company of other birds. The Jays seemed to want society or to be interested in the affairs of other birds, though the particular species of associate made no difference.

59. **Corvus brachyrhynchos brachyrhynchos.** CROW.—Fairly common. Localities A and B. Deciduous Woods Association, invades Swamp and Field. Allison, very common.

Crows were very much less abundant than was expected, or as Allison found them, or as they are in the north in winter. They were not present on the islands or coasts, and did not mingle with the Fish Crows.

60. **Corvus ossifragus.** FISH CROW.—Abundant. Localities A, B, C, and G. Littoral Association, invades Swamp, Marsh, and Field. Allison, common.

These birds greatly outnumbered the common Crow and were as typical of shore areas as Gulls, in less frequented places. Though numerous on Deer Island, near the mainland, they were absent on Ship Island, twelve miles out. The call note is usually described as a nasal *car*, and I have never seen a two-syllabled note mentioned in the literature of the species, but I found that the commonest call uttered consisted of distinctly two syllables, a hoarse *car-uh*.

61. **Molothrus ater ater.** COWBIRD.—Rare. Locality A. Field Association.

Only one specimen was seen, a male in song, on January 21.

62. **Agelaius phœniceus floridanus.** FLORIDA RED-WING.—Abundant. Localities A, B, C, D, and G. Marsh Association, invades Field. Allison, rather common.

Present in large flocks and in song all winter. In the marshes they associated with Rusty Blackbirds and Florida Grackles, and in orchards with Meadowlarks.

63. **Sturnella magna.** MEADOWLARK.—Abundant. Localities A and B. Field Association.

Meadowlarks were met with but rarely in Locality A, and then with but few exceptions on the Golf Links. In B they were very abundant, and in song all winter.

64. **Euphagus carolinus.** RUSTY BLACKBIRD.—Abundant. Localities B, C, and D. Marsh Association, invades Deciduous Woods. Allison, one flock in a pine clearing.

Found in numbers only in the marshes of the islands, and there mingling with Red-wings and Grackles, and usually singing.

65. **Quiscalus quiscula aglæus.** FLORIDA GRACKLE.—Common. Localities A, B, C, and G. Marsh Association, invades Social. Allison, a few.

These birds were uncommon except on Deer Island until the very end of March, when they invaded the towns in force. Always gregarious and noisy when present.

66. **Megaquiscalus major major.** BOAT-TAILED GRACKLE.—Uncommon. Locality D. Marsh Association. Allison, fairly common.

The few specimens I saw on Ship Island were feeding on marshy flats and were silent.

67. **Passer domesticus domesticus.** HOUSE SPARROW.—Occurred all too abundantly in all localities of the Social Association.

68. **Astragalinus tristis tristis.** GOLDFINCH.—Common. Localities A and B. Deciduous Woods Association, invades Field and Social. Allison, rather common.

Small flocks were frequent in the less noisy streets of the towns. Singing though not in full song. Last recorded March 25.

69. **Pœcetes gramineus gramineus.** VESPER SPARROW.—Fairly common. Localities A and B. Field Association. Allison, rather common.

Allison states that he found them in song, but all the birds I observed were silent. The typically associated species of the cultivated fields and orchards, found on the ground in mixed flocks, consisted of Vesper, Savannah, Grasshopper (occasionally), Chipping and Field Sparrows, and often Yellow Palm Warblers and Bluebirds.

70. **Passerculus sandwichensis savanna.** SAVANNAH SPARROW.—Fairly common. Localities A and B. Field Association. Allison, sparingly present.

Not in song and never solitary.

71. **Ammodramus savannarum australis.** GRASSHOPPER SPARROW.—Uncommon. Localities A and B. Field Association.

Not in song, and usually single, though always associated with other Sparrows.

72. **Passerherbulus nelsoni nelsoni.** NELSON'S SPARROW.—Mentioned by Allison as not common but represented in the marshes of the coast in a paper on the Sparrows of Mississippi.* The designation as *Ammodramus caudacutus* must refer to this form, the only one of the

* Allison, Andrew: The Sparrows of Mississippi. Auk, XVI, 1899, no. 3, pp. 266-270. This citation, p. 268.

Sharp-tailed Sparrows to reach the Gulf Coast in winter. I did not myself observe this bird.

73. **Passerherbulus maritimus.** SEASIDE SPARROW.—Noted in this same paper as very abundant. Of the five races of this species recognized by the A. O. U., the Louisiana Seaside Sparrow (*P. m. fisheri*) and the Macgillivray's Seaside Sparrow (*P. m. macgillivraii*) are the two forms whose winter range includes the Gulf Coast. Allison's description was *Ammodramus maritimus*. Not noted by the present writer.

74. **Chondestes grammacus grammacus.** LARK SPARROW.—Reverting to 'Allison's Winter' Birds paper, this species is recorded with the following note: "We found this species in the pine clearings, about equally common with the Vesper Sparrow, and in song. Up to this time we had found it only very rarely." I saw none myself.

75. **Zonotrichia albicollis.** WHITE-THROATED SPARROW.—Abundant. Localities A, B, C, and G. Field Association, invades Deciduous Woods. Allison, common.

White-throats were abundant in thickets, associated with Towhees, till the first of March, after which they became rare. Not in song.

76. **Spizella passerina passerina.** CHIPPING SPARROW.—Abundant. Localities A and B. Field Association, Allison, very common.

I found Chippies in frequent small or medium-sized flocks, mingling with other Sparrows, and occasionally in very large bodies, alone. I never met with them in any of the towns, as did Allison, an environment which they are commonly supposed to prefer in the south in winter. Not in song, and it was a curious sight to come across a hundred of these birds feeding briskly over some large recently burned tract, the whole flock shifting ahead as fast as a man walks, each bird moving separately, and all as silent as though they had completely forgotten their familiar little chant.

77. **Spizella pusilla pusilla.** FIELD SPARROW.—Abundant. Localities A and B. Field Association.

Present in all mixed Sparrow flocks, and not in song.

78. **Junco hyemalis hyemalis.** SLATE-COLORED JUNCO.—Allison's paper on the Sparrows, recently cited, says of the Junco: "Winters abundantly in northern Mississippi but apparently only reaches the Coast in very severe winters." My winter there was a very mild one, and I did not see these cheery little sprites.

79. **Melospiza melodia melodia.** SONG SPARROW.—Uncommon. Localities A, B, and C. Field Association, invades Littoral and Marsh.

Only about a dozen were seen all winter, and they kept to themselves and were not singing. Last recorded on February 22.

80. **Melospiza georgiana.** SWAMP SPARROW.—Fairly common. Localities A and B. Marsh Association. Allison, common.

These Sparrows did not associate with other birds. They were not observed in the extensive marshes of the islands, and were not in song.

81. **Pipilo erythrophthalmus erythrophthalmus.** TOWHEE.—Abundant. Localities A and B. Deciduous Woods Association. Allison, a few.

The call notes of Towhees were characteristic of all thickets on the mainland, and occasional birds were in full song all winter.

82. **Cardinalis cardinalis cardinalis.** CARDINAL.—Abundant. Localities A, B, and G. Deciduous Woods Association, invades Swamp, River, and Field. Allison, rare.

Allison writes: "Rare! This is hardly normal, though it is never as common here as is *C. c. magnirostris* in lower Louisiana." I found Cardinals present in numbers in all suitable situations on the mainland. They began singing the middle of February.

83. **Progne subis subis.** PURPLE MARTIN.—Rare. Localities A and B. Social Association, invades Field. Allison, a few.

The description of the status as rare applies to the Martin only as a winter resident. Allison brackets his inclusion of this species, and remarks: "A spring bird, of course, and so hardly in keeping in this list; a few were present, being seen and heard nearly every day of the trip" (Feb. 13–16). My records show that Martins were first observed on February 18, becoming common by the first week of March, and abundant by the 15th. Strictly speaking, they are probably not to be considered as a winter resident, but as the earliest of spring migrants. Their presence during so considerable a portion of the winter, however, justifies their inclusion in this list. From the first, they established head-quarters in the Martin boxes, which were to be found in nearly every back yard.

84. **Iridoprocne bicolor.** TREE SWALLOW.—Abundant. Localities A, B, C, and G. Universal Association.

The only true winter resident Swallow, these birds were to be seen at all times and in all places. They did not seem to prefer marshes and were as commonly met with over the Gulf and in the towns. Abundant till the middle of February, there was a very noticeable reduction in their numbers till the first of April, when large flocks were again in evidence. It is likely that the earlier multitudes were the real winter residents, which started north first, and the later Swallows those which were coming up from sojourns farther south.

85. **Bombycilla cedrorum.** CEDAR WAXWING.—Abundant. Localities A and B. Deciduous Woods Association. Allison, only a few heard.

The outstanding feature in the winter distribution of Waxwings here, and which I have not seen brought out in other writings, was their constant and close association with Robins. At no time were they noted separately, or in small numbers. Early mornings were the best times at which to observe the great flocks of these two species, Robins predominating, as they flew far overhead, presumably leaving the roost for the feeding grounds. The largest single flock I estimated to contain 500 Robins and 200 Waxwings, but many others of nearly equal size were seen. Robins

continued abundant till early in March, but Waxwings disappeared after February 12.

86. **Lanius ludovicianus.** LOGGERHEAD SHRIKE.—Abundant. Localities A and B. Field Association, invades Littoral. Allison, common. Usually met with singly, occasionally in pairs, and not singing.

87. **Vermivora celata celata.** ORANGE-CROWNED WARBLER—I did not record this species at all, but Allison writes of them. "Conspicuous when present, and not at all uncommon in the deciduous woods, though always single."

88. **Dendroica coronata.** MYRTLE WARBLER.—Abundant. Localities A, B, C, D, and G. Universal Association. Allison, very common and ubiquitous.

Takes first rank in abundance over all other birds. Large scattered flocks were present everywhere, on the sandy beaches, in marshes, swamps, fields, islands, all woods, and the towns. They frequently fed on the ground in company with various field-dwelling Sparrows, and were not singing. I roughly estimated the number of individuals present per county throughout this region as 15,000.

89. **Dendroica vigorsi.** PINE WARBLER.—Abundant. Localities A, B, C, and D. Coniferous Woods Association. Allison, very common. In song all winter, and met with in every pinery. Usually associated with other Warblers and Bluebirds.

90. **Dendroica palmarum hypochrysea.** YELLOW PALM WARBLER. —Common. Localities A and B. Field Association, invades Deciduous and Coniferous Woods. Allison, common.

Allison found them always more or less gregarious and associated with Pine Warblers. My notes partially confirm this, but I also often found them singly, feeding in the fields or on the Golf Links with various Sparrows. Not in song.

91. **Geothlypis trichas.** MARYLAND YELLOW-THROAT.—Uncommon. Localities A and B. Field Association. Allison, 2 heard.

Singing all winter, and frequenting low and rather dense situations. The least common of any Warbler present.

92. **Anthus rubescens.** PIPIT.—Abundant. Localities A, B, and C. Field Association, invades Littoral. Allison, not common.

When met with on the beaches these birds were in small groups of three to five, but on inland fields, particularly recently burned-over areas, large flocks were the rule, the largest seen numbering 100. Not singing, but their flight notes were always given when flushed.

93. **Anthus spraguei.** SPRAGUE'S PIPIT.—While not included in Allison's list from which I have been quoting, and not observed by myself either, a separate note by Allison reads as follows: "On January 1, 1902, a specimen of Sprague's Pipit was taken by W. B. Allison and the writer, in a low meadow cleared from the pine woods near Bay St. Louis.

It was in fine plumage and good condition. Another was seen in the same place on February 11, 1903. These two are the only Mississippi records."*

94. **Mimus polyglottos polyglottos.** MOCKINGBIRD.—Abundant. Localities A, B, C, D, and G. Universal Association. Allison, common.

Found singly, more frequently paired, and fairly often in groups of three to five. Present in all situations and with various associates, mainly Jays, Towhees, and Myrtle Warblers. They began singing the middle of February, but were not heard at night till the end of March.

95. **Dumetella carolinensis.** CATBIRD.—Rare. Localities A and G. Deciduous Woods Association, invades Swamp.

Only two were recorded. These were single, unassociated, and not in song.

96. **Toxostoma rufum.** BROWN THRASHER.—Common. Localities A, B, and G. Field Association, invades Swamp and Deciduous Woods. Allison, 2.

Met with singly and in pairs, mingling with Towhees, Cardinals or Mockingbirds, and not singing.

97. **Thryothorus ludovicianus ludovicianus.** CAROLINA WREN.—Abundant. Localities A, B, C, D, and G. Deciduous Woods Association, invades Coniferous Woods and Social. Allison, very common.

In fine song all winter, these Wrens were perhaps the most thoroughly typical bird of the region. Observed singly and paired, but unassociated. Their voice was the first to begin the morning bird chorus, commencing about five minutes before the Mockingbird.

98. **Thryomanes bewicki bewicki.** BEWICK'S WREN.—Rare. Locality A. Social Association. Allison, 2.

I saw only a single specimen, occupied in investigating the bare lattice-work of an arbor, and not in song.

99. **Troglodytes aëdon aëdon.** HOUSE WREN.—Common. Localities A, B, and C. Deciduous Woods Association, invades Field and Social. Allison, not common.

Occurred singly or in pairs in the woods, thickets, and scrub palmettos, and less often about buildings. Unassociated and not in song.

100. **Cistothorus stellaris.** SHORT-BILLED MARSH WREN.—Allison notes this species as not uncommon, but I did not record it.

101. **Telmatodytes palustris iliacus.** PRAIRIE MARSH WREN.—Uncommon. Locality A. Marsh Association.

I met with this variety of the Long-billed Marsh Wren only occasionally. They then formed a part of the typical marsh fauna and were singing.

102. **Certhia familiaris americana.** BROWN CREEPER.—Rare. Locality A. Deciduous Woods Association.

Only one was seen,—on the 17th of January.

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* Allison, Andrew: Notes from Hancock County, Mississippi. Auk, XXIII, 1906, no. 2, p. 232.

103. **Sitta carolinensis.** WHITE-BREASTED NUTHATCH.—Allison mentions this species as follows: "Very conspicuous; we saw it in company with Bluebirds and Pine and Yellow Palm Warblers, even feeding with them on the ground, in one instance." In view of such observations it is most remarkable that I neither saw nor heard a single one, and cannot account for the absence of so typical or common a bird. And I am convinced that they were absent, because it is inconceivable that so ubiquitous a form could continually escape recording if present. The variety Allison noted was probably no. 727b., the Florida White-breasted Nuthatch, *S. c. atkinsi*, as the range of the typical form, *S. c. carolinensis*, does not include the Gulf Coast.

104. **Sitta pusilla.** BROWN-HEADED NUTHATCH.—Common. Localities A, B, C, and G. Coniferous Woods Association. Allison, abundant.

The commonest notes of this species impressed me as bearing a strange resemblance to those of the Red-shouldered Hawk,—a *kee-you, kee-you*,—uttered in the cheery timbre of the Goldfinch, and of course lacking the volume and ferocity of the Red-shoulder's cry. These little Nuthatches were always seen in small bands of from two to eight individuals, very talkative, and frequently associated with other characteristic birds of the pines.

105. **Bæolophus bicolor.** TUFTED TITMOUSE.—Common. Localities A, B, and G. Deciduous Woods Association, invades Coniferous Woods. Allison, very common.

Titmice were always gregarious, singing, and in company with Chickadees.

106. **Penthestes carolinensis carolinensis.** CAROLINA CHICKADEE.—Common. Localities A, B, and G. Deciduous Woods Association, invades Coniferous Woods. Allison, common.

Found singly, but more often in groups up to five, and travelling with Titmice, but not with the Downy Woodpecker or Nuthatches as does the Black-cap in northern winters. Also they were not nearly as talkative as their northern cousins.

107. **Regulus satrapa satrapa.** GOLDEN-CROWNED KINGLET.—Fairly common. Localities A and B. Coniferous Woods Association. Allison, common.

Found in small bands, and not singing. Last seen February 22.

108. **Regulus calendula calendula.** RUBY-CROWNED KINGLET.—Common. Localities A and B. Deciduous Woods Association, invades Coniferous Woods. Allison, fairly common.

Allison found this species less common than the preceding, whereas I made the reverse observation, the difference being probably due to the greater abundance of pineries in the Bay St. Louis region. This Kinglet occurred singly and in pairs or small groups of three or four, associated with White-throated Sparrows, Towhees, and Myrtle Warblers, and was not singing.

109. **Polioptila cærulea cærulea.** BLUE-GRAY GNATCATCHER.—Rare. Locality A. Deciduous Woods Association.

These miniature Mockingbirds became fairly common by the end of March, but were rare as a winter resident. Solitary and silent when present. On December 27, on the second trip, however, two were seen together, and were mewing.

110. **Hylocichla guttata pallasi.** HERMIT THRUSH.—Common. Localities A and B. Deciduous Woods Association. Allison, common.

Met with in low wet areas of fairly dense growth and always voiceless and alone.

111. **Planesticus migratorius.** ROBIN.—Abundant. Localities A, B, and C. Deciduous Woods Association, invades Coniferous Woods. Allison, abundant.

Of the Robin, Allison has this interesting note: "Over great tracts of young pine, cleared land, and burnt forest, we often walked, seeing hardly any birds but these; they flushed before us at almost every step, and soon became an important feature of the landscape." I seldom met with Robins in such situations, or on the ground, though occasionally I would find flocks perched in the woods. As mentioned under the Cedar Waxwing, very large companies of from one to five hundred individuals were a common sight flying far overhead in the early morning. The Robin here is by no means a bird of the lawns and gardens as in the north in summer, but is as wild as the wildest and frequents only remote districts for feeding and roosting. Perhaps the fact that Robin-pie is still considered a delicacy by negroes and "poor whites" is partly responsible for this condition. Not in song.

112. **Sialia sialis sialis.** BLUEBIRD.—Abundant. Localities A and B. Field Association, invades Deciduous and Coniferous Woods, and Social. Allison, very common.

Bluebirds were quite gregarious, and singing all winter. Their most frequent associates were Myrtle, Pine, and Yellow Palm Warblers in the woods, and various Sparrows and the Yellow Palm Warblers again in the fields. One of their commonest feeding habits was like that of the Pine Warbler, clinging with much fluttering to the sides of trees, and the favorite perch in the woods was a short dead stub on any tree, as low down as possible.

Bibliography: Throughout the synopsis, Allison's paper on the 'Winter Birds of Hancock County' has been quoted, and scattered notes were found relative to some particular species as occurring on the Mississippi Coast in winter, with occasional references to summer birds. This comprises the literature of the region, but a bibliography of the Ornithology of Mississippi is here given for the future convenience of those interested in this badly neglected State. The complete files of 'The Auk,' 'Bird-Lore,' and 'Wilson Bulletin' were carefully combed, and all papers found and here

appended were consulted in the preparation of this report, and I feel that the list is fairly complete. Most of the articles are very short, many consisting of but fragmentary notes, and there is a great deal of room and need for further work in this section of the country. Those worth consulting for general purposes are marked with a star.*

ALLISON, ANDREW: The Sparrows of Mississippi.* Auk, XVI, 1899, no. 3, pp. 266–270. 16 species.

Louisiana and Mississippi Bird Notes. Auk, XVII, 1900, no. 3, p. 297. Migration notes on 5 miscellaneous species.

Notes on the Winter Birds of Hancock County, Mississippi.* Auk, XXIII, 1906, no. 1, pp. 44–47. 61 species.

Notes from Hancock County, Mississippi. The same, no. 2, p. 232. For record of Sprague's Pipit.

Notes on the Spring Birds of Tishomingo County, Mississippi.* (Northeast corner of State), Auk, XXIV, 1907, no. 1, pp. 12–25. 115 species.

AUDUBON CLUB WORK, State Reports; Mississippi; Bird Lore; VII, 1905, pp. 95–96. VIII, 1906, p. 230. XI, 1909, p. 318. XVIII, 1916, p. 214 (unofficial note).

BIRD LORE CHRISTMAS CENSUSES: Eighth; X, 1908, p. 34, Deemer, Miss., Mrs. F. E. Watrous, 44 species, 753 individuals.

Tenth; XII, 1910, p. 30, Woodville, Miss., H. G. McGowan, 31 species, 240 individuals.

Thirteenth; XV, 1913, Oak Vale, Miss., D. D. Fostersberry, 16 species, 117 individuals.

COOKE, W. W., Notes on the Occurrence of Certain Birds in the Mississippi Valley. Auk, II, 1885, no. 1, pp. 31–33. Presence of Hawk Owl at Corinth (N. E.) Miss.

HAY, O. P., A List of Birds from the Lower Mississippi Valley, observed during the Summer of 1881, with brief notes. Bull. Nuttal Ornith. Club, VII, 1882, pp. 89–94. 61 species, Vicksburg and Jackson, Miss., district.

KOPMAN, H. H., Louisiana Migration Notes. Auk, XX, 1903, no. 3, pp. 309–310. Mentions data of four species of Warblers at Bay St. Louis, Miss.

Bird Migration Phenomena in the Extreme Lower Mississippi Valley. Auk, XXI, 1904, no. 1, pp. 45–50.

Warbler Migration in Southern Louisiana and Southern Mississippi. Auk, XXII, 1905, no. 3, pp. 289–296. 13 species.

Aspects of Bird Distribution in Louisiana and Mississippi. Auk, XXIV, 1907, no. 2, pp. 169–181. Discusses migration and local distribution of birds in S. E. La. and Miss. Coast.

NESBITT, N. B., Woodcock Nesting in Northern Mississippi. American Field, XXI, March 29, 1884, p. 305.

STOCKARD, C. R., Nesting Habits of the Woodpeckers and the Vultures of Mississippi. Auk, XXI, 1904, no. 4, pp. 463–471.

Nesting Habits of Birds in Mississippi.* Auk, XXII, 1905, no. 2, pp. 146–158; no. 3, pp. 273–285. 83 species.

WOOD, C. H., Habits of Southern Cranes. American Field, XXVI, 1886, no. 8, Aug. 21, p. 175. On the breeding of Herons at Moss Point, Miss.

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NOTES ON THE ABUNDANCE AND HABITS OF THE BALD EAGLE IN BRITISH COLUMBIA.

BY ALLAN BROOKS.

THE following notes are the result of observations covering a period of about twenty-seven years (between 1887 and 1920), in the Province of British Columbia. The special features they are meant to cover in regard to the Bald Eagle (*Haliaeetus leucocephalus alascanus*) are: (1) Its present and former numerical strength in the Province; (2) The destructiveness of the species to game and waterfowl.

I have found the Bald Eagle to be generally distributed in British Columbia but always in the vicinity of water, and it is far more abundant on the coast west of the Cascade Mountains than in the interior.

All over the region east of the coast and Cascade ranges this Eagle is found in too small numbers to be of much economic importance. The food supply in the interior is uncertain and so regulates their numbers, also the nesting places are more exposed and accessible than on the coast, which tends to keep their numbers down.

On the coast, and up the larger rivers that break through the coast and Cascade ranges, the Bald Eagle finds a generous food supply and open winters which permit of its existence in larger numbers than on any other portion of the continent. My first acquaintance with the species was in the lower Fraser Valley where, although it was a very scarce breeder, large numbers were resident throughout the year, but increasing in the fall when the run of the various salmon was at its height. Here they confined themselves mainly to a fish diet as this was available throughout

the year. Salmon were largely taken before they had spawned and there were always large numbers of eagles watching the wide shallow estuary of the Chilliwack or Veddar river where it empties into Sumas Lake. Here the salmon, except such species as ascended in June and July when the water was deep, had a very hard time, very large fish were eaten alive as they attempted to cross the shallow bars, a strong fish would often flounder clear of the Eagle's claws a dozen times before it succumbed. This is the exact spot where J. K. Lord saw such numbers about the year 1856; the locality is only a few miles north of the International Boundary.

To ascertain the present status of the Bald Eagle in this region (which is now a thickly populated one), I asked Mr. W. Thacker, of Hope, how their numbers stood in 1920. He tells me that he counted over one hundred in one day while traveling around the borders of Sumas Lake.

But it is on the salt water all the way from Puget Sound to Central Alaska that this Eagle reaches the maximum of its abundance and destructiveness. It is impossible for anyone whose only acquaintance with Eagles is in the east to have any idea of their numbers on this portion of the Pacific coast; except the Raven, in many localities it is the commonest bird and I have often seen forty or more together.

As by far the greater portion of this region is totally uninhabited there is absolutely no chance of their numbers being seriously depleted by any system of destruction induced by a small bounty. The long winding inlets and channels which cut up the shore line of the whole of this region, together with the maze of islands more than doubles the total shore line, and affords a tremendous area (most of which is complete solitude) for the home of countless Bald Eagles.

When fish are easy to capture as during the salmon and herring runs these undoubtedly comprise the bulk of the Eagles' food, but at other times fish are scarce and beyond the Eagles' ability to capture them; crabs may form a good portion of their diet in summer but during most of the winter and up to June or even July Ducks and other waterfowl form the bulk of their food. These are taken in the water, usually after a long chase the victim being picked up as he comes to the surface. The only chance a

Duck has is to get on the wing at all costs. I have repeatedly seen such clumsy risers as Goldeneyes and Scoters get away by shooting to the surface right under the Eagle's tail and instantly taking wing before he can swing around. I have never seen one of these Eagles catch a bird on the wing, although they sometimes make a determined effort even after such strong fliers as Geese, Brant and Pintail.

During April, May, June and July of 1920, while living at Masset, Queen Charlotte Islands, I had exceptional opportunities to note the Bald Eagle's destructiveness as my quarters overlooked Delcatla Inlet, a quiet little tidal creek. Two or three Eagles completely terrorized this place. Every bird, even Canada Geese and Herons, instantly took to flight as soon as an Eagle showed on the wing, showing the dread these pirates inspired. Unsophisticated birds such as Holboell's Grebes that sought a sanctuary in this placid piece of water usually lasted about one day only and then their remains could be found under the favorite lookout trees of the Eagles. The following are the species of waterfowl that I have seen taken—Holboell's, Horned, and Western Grebes, Red-throated and Common Loons, Glaucous-winged Gull, Coot, Mergansers, Mallard, Pintail, Wigeon, Scaup, Goldeneye, Buffle-head, and all three species of Scoter. For some reason the various *Alcidae* seem to be able to elude them.

The grouse of these islands—the Sooty Grouse—have a hard time. As soon as the broods are hatched they are led out by the mother bird to sun themselves on the sand dunes among the small spruces along the shoreline. During this season this trip is carefully covered by low-flying Eagles which quarter the ground just as a Marsh-hawk covers a marsh, except that the Eagle flies a little higher and usually on motionless wings. The result was an almost complete extermination of the Grouse, broods of one or two chickens only were seen in a few places, and twice single chicks without any parent.

A considerable number of Eagles were shot, but fresh birds almost immediately took their place. I should estimate that there were about four Eagles per mile of shore line; in localities of abundant food supply, such as the Whaling Station at Virago Sound, forty or fifty Eagles could be seen in a day.

An exceptionally close observer, Mr. James White, who lives

on the east coast of Graham Island where large numbers of Canada Geese breed, vouches for the damage the Eagle do to these birds, taking large numbers of young birds and also the old Geese when they are in their midsummer moult and unable to fly.

On the north end of Vancouver Island several men, both whites and Indians, accused the Bald Eagle of taking young fawns, but I cannot vouch for this.

A curious fact was the immunity of a large flock of pure white domestic Ducks at Delcatla Inlet. The Eagles never attempted to take any of these although the Ducks fed among the other waterfowl and often wandered far out on the tide-flats. I often saw these Ducks drawn up in a row curiously watching the chase of a wild bird without any attempt to seek cover themselves.

It could not have been their color that rendered them immune as I saw an adult Glaucous-winged Gull killed alongside of them.

On Okanagan Lake in the interior of British Columbia the Bald Eagle preys very largely on Coots during the winter when these birds are out in the open water in large flocks. The Coots have an amazing method of defense. As soon as the Eagle swoops down they mass together and standing up in the water all flap their wings below the outstretched feet of the attacker. This seems to completely baffle the Eagle and I have never known it to fail. After two or three attempts the Eagle abandons the quest. But if any Coot leaves the flock and seeks safety by diving his fate is sealed. Sooner or later he is tired out and neatly picked up as he comes to the surface. Several observers have written of the Bald Eagle in Florida and stating that Coots form their principal winter food supply. These notes are being written at Melbourne on Indian River where the average number of Eagles seen in a short day's travel is about four. An examination of the ground below their resting places seems to indicate that here as on the Pacific Coast Ducks form a large proportion of their diet as far more remains of Scaups was noted than of fish bones.

Later at Jupiter where fish were enormously plentiful and easy to secure Scaups were persistently hunted. It was curious to note how readily the Ducks identified the Eagle. Turkey Buzzards wheeled over them unnoticed, but the instant an Eagle showed over the mangroves every Duck was a-wing.

Okawagan Landing, B. C.

A NEW WARBLER FROM SOUTHERN ANNAM.

BY J H. RILEY.[1]

IN 1918, Mr. C. Boden Kloss and party visited the Langbian Plateau, south Annam, and made a large collection of birds. These were reported upon by Mr. Herbert C. Robinson and the collector.[2] By an arrangement with Dr. W. L. Abbott, Mr. Kloss forwarded a set of the birds to the U. S. National Museum. Among the lot were three specimens identified as *Acanthopneuste trochiloides*. Recently, having occasion to identify a specimen of *A. trochiloides* from Fokien, China, collected by Mr. Arthur de C. Sowerby, it became apparent that the Annam specimens did not belong to that species at all, but were more closely related to *Acanthopneuste davisoni*. They evidently represent a distinct form, however, which I take great pleasure in naming after its discoverer.

Acanthopneuste klossi sp. nov.

Type, adult male, U. S. National Museum, No. 278,561, Langbian Peaks, 6,000–7,500 feet, South Annam, April 17, 1918. Collected by C. Boden Kloss.

Description.—In pattern and style of coloration resembling *Acanthopneuste trochiloides*, but the upper-parts washed with a more yellowish warbler green; superciliary, bend of wing, and under wing-coverts a much deeper yellow; dark crown-stripe on each side of head not deepening on the nape; under-parts heavily streaked with pale lemon yellow, especially on the cheeks, giving a distinct yellowish appearance to these parts, the inner web of the outer tail-feather white almost to the base with only a few irregular dusky markings near the shaft; a narrow white margin on the inner web of the second tail-feather, and an almost obsolete white margin on the inner web of the third. Wing, 54; tail, 40; culmen, 9.5; tarsus 18; middle-toe, 8.5 mm.

REMARKS.—The type and a female from the same locality agree rather minutely, but a second male from the same place is much lighter above and below and is considerably larger. It

[1] Published with the permission of the Secretary of the Smithsonian Institution.
[2] Ibis, 1919, pp. 392–453; 565–625.

has the outer tail-feather entirely white, except for a small dusky spot near the tip and it is more yellowish above and below than *Acanthopneuste trochiloides*, while the dark crown stripes do not deepen into sooty black on the nape. For the present I will have to assign this specimen to *A. klossi*.

Besides the three specimens mentioned above, my material consists of a male from the Tai-pei-shan district of Shensi, China; a male from Hupeh, China; and an unsexed specimen from Nepal, which I regard as representing *Acanthopneuste trochiloides trochiloides*. In addition to these I have a male from Yeng-ping-fu, Fokien, taken in December at an elevation of only five hundred feet. This is darker with more yellowish streaks to the lower-parts than *A. t. trochiloides*, and I take it to represent *Phylloscopus trochiloides fokiensis* Hartert (Bull. Brit. Orn. Club, 37, 1917, 43, Kuatun, Fokien), and the date at which it was taken seems to indicate that it does not migrate far.

A. t. fokiensis and *A. t. trochiloides* agree in having the underparts very pale gray, almost white, with only a few almost obsolete yellowish streaks; the dark coronal stripes deepening on the nape into sooty-black; the white on the inner web of the outer tail-feather merely marginal not by any means occupying the major part of the web. As the above description of *A. klossi* shows it to differ so widely from the two above races, and its relationship to *A. davisoni* is conjectural, I have concluded to describe it as a species.

Acanthopneuste trochiloides harterti and *Acanthopneuste goodsoni* I have not seen, but judging from descriptions alone they seem to have nothing to do with *A. klossi*, though the latter is apparently superficially close. The description of *Acanthopneuste davisoni* Oates (Fauna Br. India, Birds, I. 1889, 420) shows beyond doubt that it is closely allied to *A. klossi* and that the latter is probably only a race of it. Oates compares it with *A. trochiloides*, but does not say that *A. davisoni* is heavily washed with yellow below, nor that the dark coronal stripes differ in any way from that species, so I assume that the Langbian bird is different. Also Mount Muleyit (the type locality of *A. davisoni*) is a long way off from the Langbian Peaks.

Acanthopneuste trochiloides ogilvie-granti La Touche (Bull. Br. Orn. Club, 42, 1922, 55, Kuatun, Fokien) from the description

is clearly only a race of *A. trochiloides* as claimed. The describer clearly states that the white-edging on the outer rectrices was narrow. What I can not understand is how two closely related forms can occur at the same locality except on migration, and as the types of *fokiensis* and *ogilvie-granti* were taken about the middle of April, they must occur in different parts of the Province or at different elevations, in the breeding season.

Acanthopneuste trochiloides and related species at first sight strongly recall certain species, usually placed in *Cryptolopha*, especially *Cryptolopha sarasinorum* of Celebes, but as Hartert (Nov. Zool., 14, 1907, 336) has already gone into the question, I am not prepared to discuss it further at present, except to say that *Cryptolopha sarasinorum* and *Cryptolopha nesophila* have broader and longer first primaries, a shorter wing-tip, and a broader and shorter bill than *Acanthopneuste trochiloides* and should not be associated in the same genus with it. Whether the two Celebes and other related species belong in *Cryptolopha* or not is a question for the future to decide.

U. S. National Museum, Washington, D. C.

GENERAL NOTES

Horned Grebe (Colymbus auritus) in Central Missouri.—Although central Missouri is well within the limits of the Horned Grebe's distribution, it is now by no means regularly visited by this bird. Formerly the Horned Grebe was "a fairly common transient visitant in April, October and November" (Mr. Widmann—1907), but now it seems to be more rarely encountered. For that reason I consider the two following records worthy of publication.

On October 18, 1920, I saw one of these Grebes swimming about among the lily leaves in an artificial pond near Fayette, Mo. The pond was two or three acres in extent, and the Grebe kept as far from me as possible. I watched the bird for about half an hour, using my glasses, and clearly observed the salmon-buff of the feathers of the throat and upper breast. On February 16, 1921, I again saw this bird—or another of the same species, on the same pond. On the latter date there were fifteen Ringneck Ducks and four Mallards on the pond, and the Grebe was swimming

about apparently unconcerned at their presence. When they flew up, startled at my appearance, the Grebe dived, but by a little patience I was later able to get close enough to see the salmon-buff throat. This, I believe, is characteristic of the Horned Grebe.

The February record is the more important, for winter records, according to Mr. Bent (1919), are for the most part from the Great Lakes Region. —GORDON ALEXANDER, *Marshall, Mo.*

King Eider at Waterford, N. Y.—On April 30, 1922, I observed in the Mohawk River, three miles west of Waterford, N. Y., a pair of King Eiders (*Somateria spectabilis*). The male appeared entirely black except for a pyramidal patch of white covering the breast, point upward; and two large white rump patches, although the head when examined close-by proved to be an indefinite grayish color on the crown. Later the bird rose and flapped its wings causing a white collar two inches wide at the base of the neck and four inches wide in front, to spring into view. At all other times the duck was plain black with a conspicuous red "shield" on its forehead and a white patch on the breast and rump.

The female was a typical Eider with head, neck and breast buffy, the rest of body much darker and heavily barred.

Never having seen an Eider in this plumage, I drew several carefully executed sketches and sent them to the American Museum of Natural History. Mr. Ludlow Griscom in reply said that undoubtedly the ducks were King Eiders, the male having not yet completed molting into the breeding plumage. I consulted a dozen authorities, but could find no description of this plumage except in Bulletin 12, 1899, of the American Museum of Natural History, wherein Dr. Frank Chapman describes a specimen taken March 19, on Long Island, N. Y., which is practically the same as the one I saw.

The pair were very tame and were within fifty feet at one time. When I walked toward them, they merely swam slowly away, neither diving nor flying during the hour I watched them.

Eaton's 'Birds of N. Y.,' gives no record within 150 miles of here and no spring records in the State, except "to April 27" on Long Island.

There were no abnormal weather conditions at this time.—EDGAR BEDELL *Waterford, N. Y.*

Woodcock Carrying its Young.—On the morning of Saturday, June 10, at Milford, Connecticut, I saw a Woodcock carry off a young one from before me.

I was walking up a slight hill through a short lane bordered on either side by loose undergrowth, when a woodcock rose from the grass on the north side of the lane, twelve or fifteen feet from me, flew a few feet out to the middle of the lane, and then turned and flew directly away from me, disappearing over the hill fifty or sixty yards ahead. As it rose, I had a clear view of the bird in profile and again, as it turned and went away,

saw it from the rear while it was flying some little distance. The side view showed an abnormally shaped body, much thicker and rounder than one expects to see in a woodcock; and from the rear view, when the bird flew directly from me, I received the same impression.

The bird was close to me, its legs hung down straight below the body, and both tarsi and the individual toes of the two feet were distinctly seen against the sky. The body, I repeat, seemed unnaturally deep from above downward, and this was the first thing noticed from the first instant I saw the bird until it disappeared over the hill. This roundness of form—depth of body from above downward—was due, I am satisfied, to the fact that the old bird was carrying a young one clasped between its thighs. I could not see the young bird as an individual, nor the thighs of the old bird; and the lower thighs and the object held between them appeared only as a part of the body of a woodcock of very unusual shape.

Observations of the well known practice of the woodcock carrying its young are scattered through the literature of ornithology and sport for many years back; but the descriptions given it naturally lack detail. The time for observation is short and the occurrence usually a surprise to the observer. I never before saw anything of this kind. Nearly fifty years ago, Mr. John H. Sage, of Portland, Connecticut, observed the act, but in that case the young bird was held in the parent's claws, and apparently was distinctly seen. There are many reports of the young one being carried between the parent's thighs, as in the case I report—GEO. BIRD GRINNELL, *New York, N. Y.*

Oyster-catcher on the New Jersey Coast.—While on a trip to Seven Mile Beach, N. J., June 18, 1922, with Mr. C. K. Roland an Oyster-catcher (*Haematopus palliatus*) was noted. Our attention was attracted to a small group of Black Skimmers some fifty yards distant, and while examining them through our binoculars we noticed a larger bird among them and almost at the same moment exclaimed "There is an Oyster-catcher." We looked at him for several minutes through our glasses and then tried to work up a little closer, but we had scarcely taken a few steps when the bird true to his wild nature took wing, giving an excellent view of his striking wing pattern as he made off. He flew due south settling on a distant bar where he was lost to view.

Both Mr. Roland and myself are familiar with the bird having observed this species on Cobb's Island, Va.—JULIAN K. POTTER, *Camden, N. J.*

Breeding of the Florida Gallinule in Ontario.—While at a cottage ten miles from Picton, Ont., between Lake Ontario and East Lake, I made the acquaintance of the Florida Gallinule (*Gallinula galeata*), June 4, 1922. As the cottage was on an outlet between the two lakes we had a fine opportunity to watch the pair of Gallinules nesting in the edge of the reeds directly in front of the porch. The nest contained nine eggs, was bulky, built well above the water in rushes and cat tails. Some of

the rushes were bent over it. At morning, noon and evening we saw the birds, always at our meal times and in mid forenoon. They were so fascinating that I kept close watch. The sitting bird would utter a hen-like "kup" or "klack" two or three times, whereupon the mate would come swimming rapidly, practically always from the same direction, answering the call, meeting in about the same spot they would hurriedly greet each other, passing in opposite directions, the one summoned taking the place on the nest at once, while the other fed from the cow lilies. The time of feeding varied from half an hour to over an hour. As we were out often, there was no way of knowing the number of times she was relieved during the day, but for five days we saw them exchange places at least three or four times a day, the nest never being left alone. From the fact that they went in opposite directions our attention was called to the different one going on the nest and we verified this again and again.

Many Long-billed Marsh Wrens (*Telmatodytes palustris*) were building still with no eggs on June 8; a Pied-billed Grebe's nest contained one egg, while a colony of Black Terns had both eggs and young.—ANNE E. PERKINS, M. D., *Collins, N. Y.*

Wood Ibis (Mycteria americana) at Cape May, N. J.—On August 10, 1922, I had the good fortune to see a Wood Ibis sailing high overhead at Cape May Point, N. J.—the southern-most spot in the state.

There was a strong N. E. by N. wind blowing, and the sky was perfectly clear. I was watching half a dozen Broad-winged Hawks and thirty Turkey Vultures which were sailing high above me directly into the wind, suddenly I noticed another bird, with a wing spread about the same as that of a good-sized heron, but with the neck stretched straight out in front, just as the legs projected behind. It kept steadily facing the wind and rising higher and higher until upon lowering my binoculars I found I could no longer locate it with the eyes alone. It occasionally circled as it ascended but beyond a slight deflection of a wing tip there was no motion of the pinions, and the wings stretched at right angles to the body with no curve and practically no bend at the carpal joint. Within the next half hour I saw the bird twice more. Once it was going with the wind out towards the mouth of Delaware Bay, but being in the woods at the time I caught only a momentary glimpse of it. Later I saw it coming back again against the wind at a much lower altitude and I could see the prevailing white color of the plumage, and the black flight feathers, with primaries separated at the tips, the bare head and the rather short square tail beyond which stretched the legs. Altogether I had the bird under observation for nearly half an hour.

While satisfied personally with the correctness of my identification, I felt that some confirmation was desirable as I had never seen the bird in life before. I therefore sent a rough sketch of the bird as it appeared from below and a copy of my field notes to Dr. A. K. Fisher and Mr. Ludlow Griscom, these gentlemen also placed the data respectively before Drs.

Alexander Wetmore, and T. S. Palmer, and Mr. W. DeW. Miller. All five without a moments hesitation pronounced my bird a Wood Ibis.

Although I covered the vicinity several times within the next few days I saw nothing more of the bird.

So far as I am aware this is the first record of the species for New Jersey, although these are several for Pennsylvania.—WITMER STONE, *Academy of Natural Sciences, Philadelphia.*

The Ground Dove in Central Iowa.—On June 10, 1922, I saw a Ground Dove (*Chaemepelia passerina terrestris*) on the outskirts of Des Moines, Iowa, near the grounds of the Wakonda Country Club. There can be no question of the identification as this is a species with which I am thoroughly familiar, and the bird was observed at very close range. It may have been an escaped cage bird as Des Moines is several hundred miles north of the regular range of this species.—CLIFFORD H. PANGBURN, *New York City.*

Mourning Dove (Zenaidura macroura carolinensis) in Northern Michigan.—For a number of years we have had reports of a few Mourning Doves nesting on Drummond Island, a large island some fifty miles southeast of the Soo at mouth of St. Mary's River. Last year we had a report of these Doves seen at Hessel, North Shore of Lake Huron, about thirty-five miles south of the Soo and a report of a small flock some thirty miles to the west.

This year, reports started coming to us in April and were persistant. A Dove was reported in town, and many reported seeing Doves fly up from the road as they motored by at many points south and southwest of the Soo as far as Brevort Lake, Mackinac County, about fifty miles away. We did not pay much attention to the first reports, thinking the parties were mistaken, but as the reports continued we concluded there must be some truth to them. On July 1 to 4, we made a trip through this territory as far as Brevort Lake and found the Doves. Old settlers tell us they had never seen Doves before in this section and no birds at all like them since the days of the Wild Pigeon.

Whether this is a transient or permanent movement only time will tell. Certainly for this year the Mourning Dove is anything but a rare bird throughout the territory mentioned.—M. J. MAGEE AND K. CHRISTOFERSON, *Sault Ste. Marie, Mich.*

Red-shouldered Hawks Using an Old Nest.—For many years a pair of Red-shouldered Hawks have built in the woods of the Gowanda Hospital grounds. For over ten years they occupied the same nest year after year, but three seasons ago built a new one near by, on the edge of the woods, near the main road but not visible from it. This year (1922) they returned March 9, and as usual, repaired the nest. The female began to sit, exact date unknown. On May 12 she was shot under the mistaken impression that she was robbing the chicken yard; crows being really responsible.

For a week the male mourned without ceasing, flew around calling, but not in his usual wild free way, and sat dejectedly on the tree nearby, as he so often did while his mate was sitting, even perching on the side of the nest.

Early on the morning of May 19, not having seen him for several days, I was pleased to see him enter the woods and approach the nest with a new mate. On May 20 she was on the old nest. I had naturally supposed they would build another, as the stale partially incubated eggs would be in the nest. On June 2, she was apparently sitting all day, as she was on the nest late in the day. This action seems unusual, Query, what became of the old eggs?—ANNE E. PERKINS. *Collins, N. Y.*

Hawk Flights at Cape May Point, N. J.—The article in the present number of 'The Auk' on hawk flights on Fishers Island is especially interesting to anyone familiar with conditions at Cape May Point at the other end of the New Jersey coast line.

The flights occur here with the same regularity and under the same conditions, i. e., a strong northwest wind, but the birds congregate over the woodland at the southwestern corner of the peninsula and remain until the wind abates. The broad expanse of Delaware Bay, where it meets the ocean forms a break in the coast line and the migrants seem to hesitate to cross during the gale for fear of being blown out to sea. It would seem that all of the migrating hawks over a large area drift with the wind southeast to the Jersey coast, which they follow southward until confronted by the broad waters of the Bay. They often continue some distance north along the Bay shore, but eventually congregate as above described. The flights are mainly Sharp-shinned Hawks, but many Marsh Hawks and Broad-winged Hawks are present as well as Pigeon Hawks, and individuals of most other kinds. There is usually a wave or two of Sparrow Hawks too, but they stay out over the open meadows.

The same conditions of wind that brings this congestion of hawks to the southern end of the Cape May peninsula brings thousands of Warblers and other small birds, and there are Flicker and Woodcock flights when conditions are right, exactly like the Hawk flights.

Poles were formerly attached to the tops of the pine and cedar trees, and gunners stationed below slaughtered the Flickers which were continually alighting on them, by the thousand. Since the killing of Flickers has been stopped by law, local gunners have established the Sharp-shinned Hawks as a game bird and regularly resort to the point in automobiles to kill them, during September or early October. In one week in September 1920 no less than 1400 were known to have been killed, one man securing 60. Most of the gunners eat the birds and claim that they are quite palatable.

Unfortunately, while they may be epicures they are usually not ornithologists, and while from the nature of the flight, Sharp-shins constitute the bulk of the bags, many Broad-winged and Marsh Hawks are slaughtered and dead Sparrow Hawks, Whip-poor-wills and Owls are picked up on the

shooting grounds, killed doubtless before daylight, for the "sport" starts early.

Certain "oölogists" who have learned of the slaughter of the Sharp-shins are most vehement in their protests because in many places this species is becoming so rare that it is difficult to obtain sets of their eggs!—WITMER STONE, *Academy Natural Sciences, Philadelphia.*

Nighthawk (Chordeiles virginianus), Roosting on Flag-pole.—Beginning in early May a few of these birds could be seen in the evenings flying about over Jacksonville, Fla., uttering at times their single note "peent," and by the first part of August flocks of from 20 to 30 were in the air during the evenings. One of these birds was observed on several mornings during early July 1922, resting on a five-inch copper ball on the top of a flag pole on a building about 80 feet above the busy, business corner of Forsyth and Laura Streets. It would rest motionless, apparently asleep, and when the sun came up over the building about nine-thirty A. M., it would stretch its wings and fly away.—THOMAS HALLINAN, *Jacksonville, Florida.*

Olive-sided Flycatcher Summering at Green Pond, N. J.—Near Green Pond, N. J., on August 6, I found in a wild partly cut-over valley, well watered and with a sprinkling of dead trees, an Olive-sided Flycatcher. Out of curiosity I returned to this spot August 13 and found the bird in the same tree. While watching him I heard the call of another from the opposite side of the clearing. The first bird appeared to be an adult with prominent crest. It was continually bothered, when it returned from a successful dart with a dragon fly, or other insect, by a third bird of this species which looked like a bird of the year, and was without a crest —at least it showed none. The young bird was less skillful in the air than the old, though it caught some insects. I watched the two almost an hour, but the adult did not feed the other, so I could not establish relationships or whether the birds bred this year where I found them. However, the suitability of the locality; the early date (August 6); the continued presence on August 13, and the presence of a calling adult (quite frequently calling August 13), and an apparently young bird make it appear that the species actually did breed.—CHAS. A. URNER, *613 Cleveland Ave., Elizabeth, N. J.*

Prairie Horned Lark (Otocoris alpestris praticola) in Maryland in Summer.—On June 23, 1922, Mr. Ernest B. Marshall of Laurel, Maryland, shot an adult male and two juvenile Prairie Horned Larks on his farm near Laurel. These birds were presented to the United States National Museum, and are apparently the first record of this subspecies in summer in the state. The adult male, upon dissection, clearly indicates by the enlarged testicles, that it was about to breed again. The young birds, in full juvenal plumage, had the wing and tail feathers fully grown

and were as able to fly as the adult. They were undoubtedly raised in the near neighborhood.

I am aware of but one prior record in summer for the Prairie Horned Lark in the Washington region. Dr. C. W. Richmond has a record of a bird seen and heard on August 11, 1889. This bird was identified as this subspecies only on account of the date and the form *praticola* being the most probable one as a summer bird.—B. H. Swales, *U. S. National Museum, Washington, D. C.*

The Greater Redpoll in Erie County, N. Y.—There appears to be no recorded instance of the capture of the Greater Redpoll (*Acanthis linaria rostrata*) in the extreme western counties of the state. Eaton, however, reports that it has been seen on several occasions in the Geneva area by Mr. Otto McCreary ('Birds of New York,' Vol. 2). The form undoubtedly occurs with common Redpolls (*Acanthis linaria linaria*), whenever these birds visit us in numbers. However, it is not often possible to distinguish the larger subspecies with a glass on account of the restless nature of the individuals composing the flocks.

Personally, I have been able to identify *A. l. rostrata* on but one occasion. On February 4, 1917, I located about two hundred and fifty Redpolls feeding on weed seeds in an open field in East Hamburg. I succeeded in approaching within a very few rods of the birds and recognized four individuals as belonging to the larger form. The light was excellent at the time, and the flock remained long enough for me to separate the four by their larger size and darker coloration. A single Lapland Longspur (*Calcarius lapponicus lapponicus*) was likewise feeding with the flock.

Since that time, I confess that I have tried in vain to approach closely enough to Redpolls to identify the larger subspecies. Careful collecting in our flocks would undoubtedly reveal the presence of *A. l. rostrata*, and probably that of *A. hornemanni exilipes* also. I am convinced, however, that it is possible to distinguish the former in life, providing one can approach sufficiently close to the feeding birds for purposes of comparison. —Thomas L. Bourne, *Hamburg, N. Y.*

Slate-colored Junco nesting at Hornell, N. Y.—On July 11, 1922, a nest of Junco (*Junco hyemalis hyemalis*) containing three eggs and one callow young, was reported to me. It was located at the foot of a hillside near a tract of timber and was concealed under an overhanging clod of earth. On July 25, it was visited again but was empty, the young having left.

This is my first record for the breeding of the Junco in Steuben Co., and as Eaton in his 'Birds of New York' gives no record for the country it seems worthy of record.—Julia Miller, *Hornell, N. Y.*

Strange Feeding Habit of a House Sparrow.—On the evening of June 5, at 8:30 P. M., while passing the front of a brilliantly lit moving picture house on 9th Street Northwest, Washington, D. C., my attention

was attracted by some object fluttering in the air over the middle of the street. A casual glance towards it to assure myself whether it was a Cecropia or a Luna moth became an interested gaze when I discovered that it was neither but a House Sparrow, busily chasing a large Mayfly (*Ephemeridae*) which it eventually captured. It then flew back to the front of the theatre and after resting a few seconds on the arch over the doorway it flew underneath to its nest in the scrollwork over the ticket-box where its noisy reception indicated the presence of a nearly full grown brood of young. To assure myself that the occurrence was not accidental and the result of the bird having been disturbed I watched its operations for some time and was amused to see the facility with which it picked off the moths and May-flies as they appeared either in proximity to the lights on either side of the facade over the arch or within the radius of the lights below it. As the nearest grass-plots are fully two blocks from the nest and the streets offer but few opportunities to obtain food, the presence of the insects at the lights must indeed be providential, though it would be a far fetched theory to assume that the building of the nest in that particular situation was influenced thereby.

I have not previously seen Sparrows feed under these conditions though I have many times observed Pigeons in Chicago flying and feeding in front of moving picture houses on State street and Michigan Avenue.—J. R. Malloch, *U. S. Bureau of Biological Survey.*

Occurrence of the Prothonotary Warbler (Protonotaria citrea) at Dyke, Virginia.—Dyke receives its name from the narrow embankment that extends out for hundreds of yards into the Potomac River. It has a very narrow path down its entire middle, and this, for the most part, supports, upon either side, various trees and shrubs—with an undergrowth of sedge and plants found in such situations. This is one of my favorite places for collecting, and while there on the 15th of July, 1922, with Marten Benson Rowe of Washington, I undertook to "squeak up" the birds in the neighborhood. Among the species that were deceived by the call were two Prothonotary Warblers—both males—and in unusually fine plumage—considering the time of year. They afforded me a shot when they were close together on the same twig, but proved to be a little too far off for a .22 cartridge loaded with No. 13 shot. A few down feathers floated by, but that was all, and the birds made off into the thick undergrowth of the marsh close at hand. Forty years and more ago I collected this warbler in the swampy bayous around New Orleans.—R. W. Shufeldt, *Washington, D. C.*

The Cerulean Warbler at Washington, D. C.—On May 20, 1922, while with a party of the District of Columbia Audubon Society near Chevy Chase Lake, Maryland, about a mile and a half beyond the District limits, my attention was called to a bluish bird playing hide and seek in the leaves about twenty feet from the ground. Automatically raising my

glass (6x) and expecting to identify a Black-throated Blue Warbler, I noticed black streaks on the back, contrasting sharply with the bright blue. A second and better look confirmed my first suspicion that it was indeed the rare Cerulean Warbler (*Dendroica cerulea*). The entire party of seven persons had the bird under observation for six or eight minutes as it flitted lazily from one to another of the lower branches, several times pausing for some seconds on a bare twig. The shining quality of the blue on the head with the black markings on head and back, the white wing-bars, and the dark collar against the white underparts were all commented upon. While I did not particularly notice that the tail was carried high, as noted by Mr. Brewster, the white markings were conspicuous, reminding me of those in the tail of the White-breasted Nuthatch.

This unusual find led me to investigate the exact status of the species in this vicinity, to learn more of its dozen or so occurrences than the mere dates as recorded in the card files of the Biological Survey. Consultation of the catalog of the U. S. National Museum to see who had collected their specimens, revealed the sad fact that in the old catalog by species, from which our cards were copied, *Dendroica caerulescens* of the original catalog had been transcribed as *D. cerulea*, the former name not appearing in the 1859 'Catalogue of North America Birds,' used as a guide at the time the copy was made. One of the specimens was found and it proved to be *D. caerulescens*. This eliminates the records for October, 1859, and May, 1861, given in 'Birds of the Washington Region,' (Proc. Biol. Soc. Wash., XXXIV, 1921, p. 12). Since the publication of that list, Dr. C. W. Richmond's notes on the birds of this region have become available. Consultation of these and a reexamination of my father's notebooks gives full authority for all the records. The eleven definite records for this species about Washington are:

May, 1877, one seen at Arlington, Va., by P. L. Jouy.

May 5, 1888, one taken on Rock Creek, D. C., by E. M. Hasbrouck.

May 11, 1890, one taken on "Va. side of the Potomac" by E. M. Hasbrouck.

May 12, 1899, one taken on Eastern Branch [D. C. ?], by P. Bartsch.

May 29, 1902, one taken at Plummer Island, Md., by W. R. Maxon. One heard in the same tree on May 22, was perhaps the same individual.

May 9, 1904, one seen at Marshall Hall, Md., by W. W. Cooke.

May 15, 1904, one seen at Cabin John, Md., by W. W. Cooke (not A. K. Fisher as previously recorded).

May 3, 1907, one seen at Fort Washington, Md., by W. W. Cooke.

May 11, 1907, one seen at Difficult Run, Va., by W. W. Cooke.

May 13, 1909, one seen by R. W. Shufeldt.

May 20, 1922, one seen at Chevy Chase Lake, Md., by M. T. Cooke. It is reported to have been seen once in fall, but I have been unable to find any definite record.

There are three records of the breeding of this species in Baltimore County, Maryland (The Auk, X, 1893, p. 372; XVIII, 1901, pp. 137–142),

about 20 miles beyond the limits of our territory, and it therefore seems probable that this bird occurs here oftener than the records indicate. Several writers refer to its fondness for the topmost branches of high trees. By the first week of May, in this latitude, the trees are usually nearly in full leaf, and the identification of a warbler in the tops is very difficult. In this connection, it is interesting to note that in 1904 and 1907 late frosts and continued cold greatly retarded the development of the foliage, and in each of these years, the Cerulean Warbler was twice noted in this vicinity.—M. T. Cooke, *U. S. Biological Survey, Washington, D C.*

Defense Note of the Chickadee.—The article on this subject, by Mr. A. W. Schorger, in the July 'Auk' was of interest to me because of having had a similar experience the same spring. My nest was in a low decayed stub, the cavity leading straight down from the top. The locality a swampy woods; the ground at foot of stub being exceedingly spongy and full of water.

I had tapped on the nest site with no results, so thought I would look into the entrance. Bending over I peered in with one eye and was greeted with a sort of gasping hiss not unlike the noise made when the last of the water disappears from a wash bowl. I really thought that standing near the stub had forced water up into it, and that when I moved back a little to bend over it had sucked out again. So I tried treading around the stub and stepping back, but heard no noise. Again putting my eye to the hole I got hissed, and at last determined it was a parent Chickadee. After several experiments I could see part of the operation, the bird rising up a little in the cavity suddenly, and opening its mouth wide to make the noise. Withdrawing some distance the male bird finally alit on top of the stub, and though making no call audible to me the female almost instantly popped out of the entrance and he took her place. The hissing noise, together with the bird's open mouth dimly seen down in the cavity certainly would make the uninitiated think of snakes.—E. A. Doolittle, *Painesville, Ohio.*

Peculiar Note of Carolina Chickadee.—Having read with interest Mr. A. W. Schorger's article in the last number of 'The Auk' entitled, "Defense note of Chickadee (*Penthestes atricapillus atricapillus*)," I might set forth a similar experience that I had with a Carolina Chickadee (*Penthestes carolinensis carolinensis*).

On March 15, 1920, a Chickadee with a bill-full of feathers was seen in my yard; it soon went into a hole in a dead peach stub about seven feet up. On April 1, two eggs, covered with down, were found in the cavity; six eggs were laid in all.

Late in the afternoon of March 28, I tapped on the tree; one of the birds was inside and gave a peculiar note, not a hiss such as Mr. Schorger heard, but more like a little sneeze. This was repeated every time I tapped. Several times the bird tapped on the inside of the cavity. Finally it put its head out of the hole and calmly looked at me as I stood about three

feet away. I withdrew and it went back into the hollow. No eggs had yet been laid.

Five out of the six eggs hatched and the young were successfully reared; they left the nest on the morning of May 5.—E. VON S. DINGLE, *Summerton, S. C.*

Bird Interference on High Tension Electric Transmission Lines.—While changing a live, 3-phase, 13,000 volt line it was observed that the insulators and metal cross-arms were favorite resting places for the Turkey Vultures (*Cathartes aura septentrionalis*), The Florida Crow (*Corvus b. pascuus*), and the Loggerhead Shrike (*Lanius ludovicianus*). The Vultures and Crows will perch upon the insulators, metal cross-arms, or the static ground bayonets and the expanse of their wings is sufficient to produce a short-circuit between the conductors or a ground connection between the conductors and the static ground system. In the case of 13,000 volts, the current will arc 7/10 of an inch through the air to connect with the bird's wing and the arc will follow several inches, often burning up the bird and melting the line fuses. In a slightly different way the Shrikes meet their death and suspend industries which depend on the high tension line for power. The Shrike flies with its grasshopper or lizard to the pole and decides that the sharp end of the tie wire is an excellent place to impale its victim. When the Shrike comes within striking distance of the voltage on the live conductor a flash-over occurs and a bird and a fuse are gone. It is doubtful whether the birds will ever appreciate the danger of this silent, unseen power. These observations were made in South Jacksonville during the summer of 1921.—THOMAS HALLINAN, *Jacksonville, Florida.*

Scarcity of Breeding Birds in Duval County, Florida.—While making a survey of the cold-blooded vertebrates in Duval County during December, 1920; February, March, May, June, September, October, 1921; and January, February, March, April, May, June, July, 1922, our parties of from two to nine observers covered in the aggregate about 925 miles through the different types of woods—pines, palmettoes, cypress, oaks, bays, magnolias, and regions of thick undergrowths as well as fresh and brackish water swamps. After covering all this territory and making a special effort to note the existance of nesting birds, only two observations were made. One was the abandoned nest of a Fish Hawk (*Pandion haliaëtus carolinensis*) on a high tree near New Berlin, noted June 4, 1922, and the other was a Brown Thrasher (*Toxostoma rufum*) with a nest containing four eggs in a thick shrub about three feet from the ground near Orange Park, noted April 23, 1922. In this region, at certain seasons, the migrants were numerous but the resident birds, during this period of observation were relatively few in numbers and in species. This negative evidence concerning the existance of occupied or abandoned bird's nests may be due to this region's position in the zone of abrupt transition from the

near-tropical climate of Central and South Florida to the temperate latitudes to the north.—THOMAS HALLINAN, *Jacksonville, Florida.*

Notes on Birds of Madison, Wisconsin, and Vicinity.

Phalacrocorax a. auritus. DOUBLE-CRESTED CORMORANT.—During the last few years there has been a striking increase in the numbers of this species during migration. On May 1, 1921, a flock of at least 500 was seen to leave the "Widespread" and start northward, the front of the column being about half a mile wide. On April 29, 1922, three flocks numbering about 200, 200, and 50 individuals, were seen flying a short distance apart over Lake Mendota. On the following day there were about 1,000 birds on the lower lakes.

On April 12, 1922, a flock of 14 Double-crested Cormorants was seen over the waters of Lake Monona. They flew in ascending circles, now soaring, now flapping their wings, until they had attained a great height; then suddenly swinging into V-formation, they started southward and were soon lost to view. Their behaviour corresponded exactly with that reported for a Loon (*Gavia immer*) by Barnes (Bent—Life Histories of North American Diving Birds, p. 55); this observation, coupled with the fact that the Loon is rarely if ever known to sail, renders it highly probable that there was an error in identification.

Passerherbulus n. nelsoni. NELSON'S SPARROW.—A fine male was collected near De Forest, Sept. 24, 1921. Although listed by Kumlien and Hollister as abundant at Lake Koshkonong in the fall, this is the only specimen that the writer has seen in this vicinity during a period of ten years.

Nyctea nyctea. SNOWY OWL.—I was informed by Mr. George Williamson that a Snowy Owl spent about ten days in February of this year on his farm on Lake Waubesa.

Bombycilla garrula. BOHEMIAN WAXWING.—This species was present in small numbers during the past winter, from Dec. 24, to March 22, 1922.

Pinicola enucleator leucura. PINE GROSBEAK.—A flock of six was seen on Jan. 1, and another of eight on Feb. 22, 1922, all in female or immature plumage. In both cases the birds were feeding on the buds of the European larch (*Larix decidua*).

The Bohemian Waxwing and Pine Grosbeak, contrary to what might be expected, are by no means common winter visitors.

Buteo platypterus. BROAD-WINGED HAWK.—This appears to be an uncommon breeding species in southern Wisconsin. A set of three eggs—incubation about ten days—was taken near Madison on May 27, 1922, and turned over to Prof. George Wagner of the University of Wisconsin. The nest, situated about 37 feet from the ground in the forks of an oak in the midst of a thick woods, was lined with bark scales, a few chicken feathers, and dry but green oak leaves; outside dimensions 24 x

17 x 19 inches high; inside dimensions 8 x 7 x 5 inches deep. The eggs averaged 1.46 by 1.95, and varied greatly in pattern, from a light wash with lilac to heavy blotches of chocolate. When the nest was discovered both parents, one with a garter snake in its talons, were perched near the nesting tree and showed no concern over my presence; however, as I approached the nest, one of the birds made a few passes in Accipiter style. It is interesting to note that in 1915, a pair of Cooper's Hawks raised four young on the identical nesting site, and this year a pair is nesting but 500 feet from this spot.—A. W. Schorger, *Madison, Wis.*

Two Nesting Notes for the Madison Wisconsin Region.

Vireo belli belli. Bell's Vireo.—On June 9, 1922, I collcted a male Bell's Vireo and took a nest containing one egg. The female left the nest as I approached and was not seen agin. The male was very tame and vigorously protested my intrusion. This is probably the first nesting record for Wisconsin. On July 3, 1914, Mr. William Schorger secured the first state record by collecting a singing male in almost the exact locality, the Winga Lake district, in which I took the nest of June 9. (See 'Auk,' 1915). My bird has been compared with that of Mr. Schorger.

Thryomanes bewicki bewicki. Bewick's Wren.—Bewick's Wren was placed on the hypothetical list in the Kumlien-Hollister State List (1903). But as I reported in 'The Auk' (April, 1922), I have seen the birds on two occasions. Yesterday, June 15, I saw a nest with one egg in the bee-yard of Mr. Ed. Ochsneir of Prairie du Sac, thirty-five miles north of Madison. It was the second venture of the wrens, the first nest having contained eight eggs from which seven birds emerged. Five of them were about the yard every day. The first nest was placed in a hollow among the sawdust and shavings of a large covered tin tub; the second in the top of an active bee-hive among sawdust and rags, Access to both was obtained through small openings in covering joints. Although these nests are probably the first on authentic record for the state, I am confident that a few pairs have nested along the Wisconsin River valleys for years.—Warner Taylor, *219 Clifford Court, Madison, Wis.*

Nesting Notes fron Ladysmith, Wisconsin.—The following nesting notes were secured by me in 1911. Never before had I so keenly realized how small the chances really are for a bird to ever leave the nest, not to mention becoming an adult. Circumstancs did not permit very extensive investigation or much time to be devoted to keeping discovered nests under observation but the notes such as they are follow.

Successful Nests.

1. Hairy Woodpecker.—Located May 31, 18 ft. up in a birch tree. Young in nest, left about June 4.

2. Phoebe.—Located May 29, under eaves of house. June 2, 1 egg; June 4, 2 eggs; June 5, 3 eggs.

3. Baltimore Oriole.—Located June 1, 35 ft. up in an elm. June 1, four young. Left nest about June 30.

4. Bronzed Grackle.—Located June 4, 40 ft. up in an elm. At least one young bird left in safety, probably more.

5. Warbling Vireo.—Located June 6, 30 ft. up in a basswood, between two small branches. June 10, as I watched the bird on the nest I thought that it sang. June 28, the young (three) left.

6. House Wren.—Located May 28. Nest was first placed in a tin can in a rubbish heap, but was finally located in a bird-house which I placed nearby. June 23 the house was opened and 8 young found. June 28 the young left the nest, flying with no practice.

7. House Wren.—Located June 14. Placed in the cavity of a hollow stump. The opening above was roofed over. June 22, 6 young were found.

8. Robin.—Located May 28, 30 ft. up in a maple. June 17 young were in nest.

9. Long-billed Marsh Wren.—Located June 12. Several "dummy nests" were found previous to this time but the real nest was much more carefully concealed in a clump of coarse grass, well down and over standing water. Contained 5 eggs June 12; June 19, young were found; June 23, young had left.

10. Downy Woodpecker.—Located June 19, 9 ft. up in a "stub." Entrance was on the under side of a limb. Contained young.

11. Ruby-throated Hummingbird.—Located June 23, 18 ft. up and 10 ft. out from the trunk of a maple. Bird seen several times later brooding.

12. White-throated Sparrow.—Located July 3. Nest was flush with the moss in a spruce-swamp, and was well concealed by a blueberry plant. Contained 3 young and 1 egg.

13. Vesper Sparrow.—Located June 27, under low plants; contained 3 eggs.

14. Red-winged Blackbird.—Located June 7. Nest was over standing water. Contained 4 eggs. June 12, the nest was visited and the young were found to be growing rapidly; June 19, the young were ready to fly.

Unsuccessful Nests.

1. Kingbird.—Located June 4, 20 ft. up in a maple tree; June 13, 1 egg; June 17, 4 eggs; eggs destroyed. Cause(?)

2. Red-winged Blackbird.—Located May 22; May 22, 3 eggs; June 7, nest visited; four dead young found under three inches of water. Young destroyed. Cause, flood.

3. Chewink.—Located May 28. Nest well concealed under tuft of dead grass, contained 3 eggs. Eggs destroyed. Cause (?)

4. Red-eyed Vireo.—Located June 4, 22 ft. up in a maple tree. Eggs destroyed. Cause (?) This tree later blew over.

5. Chestnut-sided Warbler.—Located June 2, 30 inches from ground in hazel bush; June 2, 1 egg; June 3, egg gone; June 4, Cowbird egg was found in nest. (The Cowbird egg remained in the nest all summer).

6. Oven-bird.—Located May 29. Nest was well roofed and concealed and the old bird pretended to have a broken wing almost fooling me into thinking her a young grouse, contained 3 eggs. Eggs destroyed. (?)

7. Oven-bird.—Located May 29. Nest sunken flush with ground and well concealed, contained 2 Ovenbird and 2 Cowbird eggs; June 12, the Ovenbird eggs were hatched. Eggs smashed, young gone. Cause (?)

8. Marsh Hawk.—Located June 19. Nest was in a small clump of "stag alder," and was well built up. June 23, visited nest and found the old bird circling and calling excitedly above a Canada Porcupine which was within 4 ft. of the nest, and was evidently after the eggs.

I forced the porcupine to leave but we two intruders at the same time must have discouraged the bird as the two eggs remained for several weeks. The porcupine must have observed the old bird carefully and "spotted" the nest at a distance as the nearest tree was several hundred feet away.

9. White-throated Sparrow.—Located June 26. Nest was flush with the moss in a spruce swamp. I stepped within a foot of the sitting bird before she revealed the nest to me by flying. Eggs destroyed. Cause (?)

10. Indigo Bunting.—Located June 28. Nest 18 inches from the ground in a hazle bush; contained 3 eggs. Eggs destroyed and the nest tipped partly over. Cause (?)

Out of the above 24 nests 10 were unsuccessful. Although several cases were noticed during the nesting season in which young birds were seen flying about when the nest itself was not actually found, we have no means of telling what proportion of undiscovered nests failed to produce young.

Some nesting notes were secured even when the nests were undiscovered.

On May 2, full-fledged young Crows were seen.

On May 22, a Purple Finch was seen feeding young.

All through June coveys of Ruffed Grouse were to be found, but I believe that if the truth were known it would be found that an even greater percentage of casualties is common among these birds. In 1920, I found three Ruffed Grouse nests. One nest containing 11 eggs produced 9 young whereas the other two were destroyed by skunks. Several nests were found later deserted, and some of the eggs still remaining.

Four nests were discovered but not visited again owing to various reasons. These were: Black-billed Cuckoo, Chestnut-sided Warbler, Least Flycatcher, Warbler (possibly a Mourning Warbler), which held 4 young on June 24.

Two American Bitterns nesting in a marsh nearby were forced to carry food a distance of two miles as a result of drought. They made the trip from sunrise to sunset for more than two weeks, the round trip requiring

something over an hour on the average, although they frequently made it in less time.

A pair of White-breasted Nuthatches appeared during the summer with their nine offspring. A nest of Migrant Shrikes was successful, but unfortunately data were not secured. On May 31 young Maryland Yellow-throats were seen in three separate localities.

While the nests and notes given above seem to overbalance on the "successful" side, I believe this is because young birds are so much more conspicuous than deserted nests. Certainly the difficulties met by some of the above birds show that it is not an easy matter to raise a family in the wilds. The loss of life between the time of leaving the nest and fall must be appalling. Evidences of Ruffed Grouse, Thrushes, Woodpeckers, and other birds killed by Hawks were common all summer. These notes give only a meager idea of the mortality ocurring at nesting time, but to me the following of the histories of nests is a very fascinating pursuit. WALLACE B. GRANGE, *Ladysmith, Wisconsin.*

Scarcity of Arctic Birds in Europe.—Dr. Graham Renshaw, editor of 'Natureland', (published in Manchester, England,) has very recently returned from his trip to the coast of Norway; and in a letter to me, dated the 22d of July last, he says: "My Norway trip was zoologically *most* disappointing! At Hammerfest certainly there were plenty of Ravens; also I saw a few Hooded Crows. On the way to North Cape I saw five seals, but at a great distance; another of the party saw a whale. These however, with a few Skuas, Gulls, and Guillemots (=Loons) made up the lot; it was a regular wash out for me who had hoped to see one or two rorquals, dozens of seals and *hundreds of thousands* of Eider Ducks! What a pity the boat turned back at North Cape instead of continuing to Spitzbergen, where I might have seen the thousands of Little Auk that Professor Newton used to write about!"—R. W. SHUFELDT, *Washington, D. C.*

RECENT LITERATURE.

Stuart Baker's 'Game Birds of India.'[1]—There are many ornithologists who combine with their love of birds a love for beautiful books and to these particularly Mr. Stuart Baker's volumes on Indian game birds will make a strong appeal. Beautifully printed on heavy paper, bound most attractively and illustrated by numerous excellent colored plates by Grönvold, Lodge and Keulemans, they seem to combine all that could be asked for in the makeup of a book.

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[1] The Game Birds of India, Burma and Ceylon, Vol. I. The Ducks and their Allies, Vol. II. The Snipe, Bustards and Sandgrouse. By E. C. Stuart Baker. Published by the Bombay Natural History Society.

Since 1896 Mr. Baker has been publishing illustrated articles on the Indian game birds in the 'Journal' of the Bombay National History Society, and in 1908 those dealing with the ducks and their allies were published as a separate volume by the Society, with additions and corrections. The first volume of the present series is a new edition of this earlier work with further additional matter. The second volume covers in a similar way the Snipe, Bustards and Sandgrouse, while two other volumes, to appear shortly, will treat of the Pheasants and Partridges.

The text is full and replete with information on the distribution and life histories of the various species, making a valuable handbook for the sportsman as well as an authoritative work of reference for the ornithologist.

Mr. Baker is to be congratulated on bringing his nomenclature up to date, something that is too often neglected in semi-popular works of this kind. He seems also to have followed the original spelling of the names in most cases, although we notice that *Aix* appears in the emended form *Aex*.

Among the rarer species treated is the Pink-headed Duck (*Rhodonessa caryophyllacea*), one of the most remarkable ducks from the standpoint of coloration. It may not be generally known to American ornithologists that a full plumaged male of this species is preserved in the collection of the Philadelphia Academy, being part of the famous Rivoli collection. We can heartily recommend this work as an authority on the Indian Game birds and while we await the appearance of the subsequent volumes with interest, we congratulate both author and publishers on a fine piece of work admirably brought out.—W. S.

Mathews' 'The Birds of Australia.'[1]—The two latest parts of Mr. Mathews' work conclude the treatment of the Sylviidae, although, through an apparent error, these birds as well as the Bablers are included in the family Orthonycidae in the "contents" of Vol. IX which accompanies part 9.

The treatment follows that of recent issues, subspecies being discussed at length in the text but placed in the synonymy of the species. The difficult Grass Warblers and Brown Tits are considered in much detail, and as a result the author places all of the latter as subspecies of *Acanthiza pusilla* including *A. ewingi* and *A. diemenensis*.

We notice one new subgenus *Subacanthiza* (p. 449) for *Acanthiza lineata* and the following new subspecies: *Cisticola exilis diminuta* (p. 373)' Cape York; *C. e. exaggerata* (p. 373), S. Victoria; *Acanthiza pusilla lingeraudi* (p. 430) Lingeraudi; *A. p. dundasi* (p. 431), Lake Dundas, W. Australia; *A. p. northi* (p. 431), Wilson's Inlet, S. W. Australia; *A. p. cobborensis*

[1] The Birds of Australia. By Gregory M. Mathews. Vol. IX.–Part 8 (May 22, 1922) pp. 361–416. Part 9. (Aug. 3, 1922) pp. 417–518. H. T. and G. Witherbp, London.

(p. 432), Cobbora, N. S. Wales; *Pyrrholaemus brunneus milligani* (p. 489), Wongan Hills; *P. b. kalgoorlii* (p. 489) Kalgoorli; and *P. b. centra* (p. 489), Central Australia.—W. S.

Lucanus on 'The Mystery of Bird Migration.'[1]—Friedrich von Lucanus, President of the German Ornithological Society has prepared a volume bearing the above title and treating of the various aspects of the migration of birds. Some idea of the scope of the work may be gained from the headings of the various chapters: Historical Review; Bird-banding; The Migration of Certain Species from the Results of Bird-banding; The Origin and Cause of Migration; The Direction of Migration and the Migration Route Problem; Orientation of the Migrating Bird; Relationship between Weather and Bird Migration; The Height of the Flight; The Velocity of the Flight; The Return in Spring; Peculiar Habits of the Migrating Bird. There follows an account of the Bird Observation Station at Rossiten and a brief chapter of Conclusions. In the latter, the author states that the autumnal flight of European migrants takes a westerly or southwesterly direction, and that for certain species a definite migration route may be designated. A migration route, he points out, is not a narrow highway but a broad, though well defined, area which is however not so wide as the breeding area.

In Europe there seem to be three principal routes (a) the west coast, and (b) the Italian-Spanish route, both of which cross the Mediterranean at Gibraltar; and (c) the Adriatic-Tunisian route which crosses by way of Sicily. He further states that birds of the same species and from the same breeding-zone may follow different directions on migration and seek different winter quarters, while between the direction of the flight and the geographic position of the breeding grounds there is no necessary connection. Birds from the same breeding spot flying in the same direction do not always attain the same destination but winter at some point within the migration path. The migratory impulse is also variably developed in different individuals.

Birds, moreover, do not reach their winter quarters by the shortest route but often make considerable detours. Our author also states that the autumnal migratory instinct awakens much earlier in birds of the year than in the adults, which results in a separation during migration.

In the spring the migrant has always the impulse to return to its home i. e. birth place.

The work is a valuable contribution to the subject of migration and contains much important data especially in the summary of recoveries of banded birds reported in various publications.

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[1] Die Ratfel des Vögelzuges. Ihre Losung auf experimentellen Wege durch Aeronautik, Aviatik and Vögelberingung. Von Friedrich von Lucanus. Langenfalza, Hermann Beyer and Sohne (Beyer and Mann) 1922. pp. 1–226, four text figures and a plate.

The whole subject is however treated wholly from a European point of view and but few contributions to the literature have been consulted except those by Germans, French or some of the English writers. Naturally in failing to consult American publications much important data bearing upon the more general problems of migration have been omitted. The experiments of Dr. Watson with terns on the Dry Tortugas and the numerous papers by Cooke and others cannot be ignored without seriously impairing the value of an author's conclusions.—W. S.

Van Oort's 'Birds of the Netherlands.'[1]—Parts 13–14 of this notable work consist, like those immediately preceding, wholly of plates, which are quite up to the standard. They consist of a Vulture, several Hawks and Eagles, the little Rails (*Porzana*) and, of special interest to Americans, various of the shore birds including species common to both sides of the Atlantic.

These show the Phalaropes, Golden Plover, Knot, and other species, in their various plumages while the large size of the figures—too large perhaps from an artistic point of view for the size of the sheets, nevertheless make it possible to show details of coloration with great accuracy.—W. S.

Scoville's 'Wild Folk.'[2]—In this little volume, Mr. Scoville's facile pen has sketched vivid pictures of the lives of various wild animals and birds which are most fascinating reading for those who enjoy the great out doors and like to have their information presented in the form of nature-fiction, if we may so term it. "True stories about the wild folk', the publishers call them and so they are in the sense that the novel is a true story. But the novel is not history nor biography and we personally prefer nature-history and nature-biography and therefore we like Mr. Scoville's work best when he is describing actual incidents of his own observation, and had hoped that he would follow in the footsteps of Bradford Torrey, Frank Bolles and others of that school.

All forms of nature writing, however, have their place in literature and Mr. Scoville has acquired a high ability in his chosen field. His backgrounds based on personal studies are charming, and the lives of his characters skilfully and cleverly sketched. Only one chapter in the present volume treats of birds; "High Sky," in which a fanciful picture of the migrating host of birds is followed by accurate data based upon Professor Cooke's papers on the migratory routes of many species. While this chapter contains much instructive matter the critic might question the Gyrfalcon being driven south by cold as early as the plover flight, or a

[1] Ornithologia Neerlandica. De Vogels van Nederland door Dr. E. D. Van Oort. Martinus Nijhoff's Graven Nage, Afl. 13–14.

[2] Wild Folk. By Samuel Scoville, Jr. With Illustrtaions by Charles Livingston Bull and Carton Moorepark. The Atlantic Monthly Press. Boston. 1922. pp. 1–184, 8 plates, Price $2.

"multitude" of Ruby-throated Hummingbirds migrating together across the sky while the Rose-breasted Grosbeak whose "rose stain" was entirely lost in the autumn had more likely never yet acquired it.—W. S.

Taverner's 'Birds of Eastern Canada.'[1]—A second edition of this valuable work is before us, which presents a very creditable appearance with its excellently printed letter press and attractive plates from color sketches by Hennessey. It will prove of inestimable value in providing those interested in the avifauna of eastern Canada, with just the information they desire and should be instrumental in developing many a young bird-lover into an ornithologist.

We have fully reviewed the first edition so that the generally excellent character and scope of the work is already familiar to our readers.

From a purely technical standpoint we fail to grasp the author's object in granting distinctive headings to certain genera, while others are lumped together, as for instance "*Genus Thryothorus*" and "*Genus Thryomanes*" but "*Genera Cistothorus* and *Telmatodytes.*" If he does not regard the last two as separable, why does he not live up to his convictions and unite them instead of adopting this misleading and inconsistent practice? English names for genera are also rather unfortunate and can prove of little use: i. e. "Ground Warblers for a group including the Chat; "Grosbeaks" for the Rose-breast but "Blue Grosbeaks" for *Guiraca*; and "Yellow-bellied Flycatchers" for all the *Empidonaces*. It is difficult also to see why some of these names should be singular and others plural.

Errors in the systematic index still place almost all the Sparrows in the genus *Acanthis*; the Parula and Worm-eating Warblers in *Vermivora*, etc.

These are purely technical points, however, and will not detract from the great usefulness of Mr. Taverner's book. It seems to us, however, that in a popular work some definite and generally accepted scheme of arrangement should be rigidly adhered to; such publications are hardly the place for exploiting original schemes. We notice incidentally that *Linnodromus* is consistently mispelled.—W. S.

Swarth on 'Birds and Mammals of the Stikine River Region.'[2]—This important contribution covering Mr. Swarth's explorations in British Columbia and Alaska, May to September 1919, has been prepared with the care and thoroughness that characterize all of his publications. The collection made by the author and his associate Mr. Joseph Dixon, comprised 534 mammals and 638 birds as well as other material, including

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[1] Birds of Eastern Canada (Second Edition). By P. A. Taverner. Memoir 104, No. 3, Biological Series. Dept. of Mus. Geol. Survey, Canada. Ottawa, 1922, pp. i–iv+1–290 with 50 colored plates (included in pagination).

[2] Birds and Mammals of the Stikine River Region of Northern British Columbia and South-eastern Alaska. By H. S. Swarth, Univ. of Calif. Publ. in Zool. Vol. 24, No. 2, pp. 125–314. Plates 8 and 24 text figs. (Issued June 7, 1922.) Price $2.50.

photographs which are used liberally throughout the text and give one a good idea of the country traversed.

The report consists of: (1) Itinerary and Descriptions of Localities; (2) Topography of the Region and its Bearing upon Animal Life; (3) Zonal and Faunal Position of the Stikine Valley; (4) General Accounts of the Mammals (34 species); (5) General Accounts of the Birds (127 species); (6) Literature Cited.

The Stikine valley, which cuts directly through the Coast Range, connects two wholly different areas—the humid Sitkan region of the coast, with its equable temperature, and the much dryer interior with its wide range of seasonal climate. This river valley, while very old, was choked with ice at no very remote period and with the retreat of the glaciers was again opened up. The advance of the animal life northward again has however, been mainly east and west of the Coast Range, and while various species have extended their range from the interior coastwise down the Stikine Valley and vice versa it has not proven an important channel either from the viewpoint of range extension or migration so far as Mr. Swarth's studies indicate.

The account of the relationship, distribution and habits of the various birds are replete with valuable and interesting data. Most important is that of the Bohemian Waxwing which was found nesting in the vicinity of Telegraph and Doch-da-on Creeks, and eggs and young secured. A beautiful colored plate of the young birds from a painting by Allan Brooks forms a frontispiece to the report.

The account of the Olive-backed Thrush (*Hylocichla u. swainsoni*) is particularly interesting in its bearing on the subspecies problem. Mr. Swarth found this eastern form ranging down to within thirty miles of the coast—the habitat of *ustulata* —and yet showing no trace of intergradation, in fact the specimens were more extreme in the characters of *swainsoni* than examples from the eastern United States! If they are to be regarded as subspecies he says, "it must be on the criterion of individual variation rather than that of gradual blending through the population of contiguous areas." Yet Mr. Taverner in his 'Birds of Eastern Canada' distinguishes a species and subspecies as two different things, saying, "It [the subspecies] differs essentially from a full species by showing intergradations with allied races of equal rank." It seems to us in the face of evidence presented by Mr. Swarth and others, that it is foolish to establish any difference except one of degree between the two, and the rank of many a form will always be a matter of personal opinion. Mr. Swarth maintains his admirable attitude on nomenclature, following the A. O. U. 'Check-List' except where he has evidence which seems to him to warrant the recognition of forms as yet not accepted by the A. O. U. Committee. "I have made no attempt," he writes "to be 'up to date' in the adoption of the scores of changes proposed in recent years, not yet acted on by the Committee, and regarding which I have

no new facts to offer or upon which I cannot form an independent opinion." If others would adopt such a common sense attitude our nomenclature would be far more stable and understandable.

Forms the recognition of which he advocates, and which are not yet on the A. O. U. List, are *Dendragapus obscurus flemingi, D. o. sitkensis, Canachites canadensis atratus, Loxia curvirostra bendirei, L. c. sitkensis, Vermivora celata orestera, Dendroica coronata hooveri, Penthestes gambeli abbreviatus,* and *Planesticus migratorius caurinus. Junco hyemalis connectens* of Coues is resurrected as applying to the form breeding in the Stikine Valley with an exhaustive discussion of the case, and of the relegation of this and other puzzling forms to hybrid origin.

Mr. Swarth is to be congratulated upon another notable contribution to the zoology of the north-west.—W. S.

Lönnberg and Rendahl on the Ornithology of Ecuador[1].—This paper is based on collections presented at different times to the Royal National History Museum at Stokholm by Mr. L. Söderström, Swedish Consul at Quito. There is, first, a list of the characteristic species of each zone with a comparison with Chapman's lists for Colombia, and then an annotated list of all the species contained in the collections, with notes on several by Mr. Söderström. The following are named as new: *Nothocercus plumbeiceps* (p. 13) Baeza; *Odontophorus söderströmii* (p. 16) Napo; *Momotus lessoni gualeae* (p. 51) Gualea; *Oreotrochilus chimborazo söderströmi* (p. 56) Quillotoa; *Heliothrix auritus, major* (p. 61) Pisagua; *Pseudocolaptes johnsoni* (p. 69) Baeza; *Tityra nigriceps gualeae* (p. 75) Gualea; *Iridophanes pulcherrima gualeae* (p. 83) Gualea, and *Pyranga rubriceps rufistigmata* (p. 86) Baeza.—W. S.

Wetmore on Bird Remains from the Caves of Porto Rico.[2]—This is a final report on the bird bones collected in the caves of Porto Rico by Mr. H. E. Anthony in connection with his well known researches on the extinct mammalian fauna of the island.

Forty-two species are represented of which all but seven are birds now living on the island, bodies of many of which were doubtless carried into the caves by two species of owls which frequent them and whose skeletons were also found there. The seven extinct species were previously described and named by Dr. Wetmore, and in the present paper the bones upon which the diagnoses were based are figured.—W. S.

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[1] A contribution to the Ornithology of Ecuador. By Einar Lönnberg and Halmar Rendahl. Arkiv. F. Zoologi. K. Svensk. Vetsakad. Band 14, No. 25, pp.1–87. May 11, 1922.

[2] Bird Remains from the Caves of Porto Rico. By Alexander Wetmore, Bull. Amer. Mus. Nat. Hist. XLVI, Art. IV, pp. 297–333. May 22, 1922.

Shufeldt on Subfossil Bird Remains from Bermuda.[1]—This paper originally prepared for publication by the American Museum of Natural History is based upon a collection in that Museum, the Mowbray collection in the U. S. National Museum, together with collections made by Messrs. Edward McGall and Anthony Tall, most or all of the last, we understand, being now in the Carnegie Museum at Pittsburgh.

Dr. Shufeldt refers the material which is very extensive and mostly in an excellent state of preservation to three forms, *Puffinus mcgalli* (p. 354) *P. parvus* (p. 356) and *Aestrelata vociferans* (p. 365), all of which are here described as new, the *Aestrelata* being identified with the famous "Cahow." Elaborate descriptions and figures of the various bones are presented and relationships with allied species discussed.

Attention should be called to the fact that Dr. Shufeldt's so-called new species are not "new" from this publication as all were published about six years previously in 'The Ibis' (Oct. 1916, pp. 623–635), although no reference is made to this paper nor to an earlier one by Nichols and Mowbray in which it seems likely that some of the same forms are described. This fact was clearly set forth in 'The Auk' (1917, p. 98) and there is no excuse for an author to deliberately ignore an earlier paper based on material similar to his own.—W. S.

Recent Papers by Bangs and Penard.[2]—A new form of *Edolius E. forficatus potior* (p. 25) is described in a recent issue of the 'Proceedings' of the New England Zoological Club, from Anjonan, one of the Comoro Islands, northwest of Madagascar, and a new name *Leptotila fulviventris angelica* (p. 29) is proposed for Sennett's Dove, type from Brownsville, Texas. The name *brachyptera* proving to be a synonym of *fulviventris*. Mr. Penard, alone, describes *Heteroglaucis philippinae* (p. 27) a new Hummingbird from Surinam.—W. S.

Recent Papers by Oberholser.[3]—Dr. Oberholser has several nomenclatural notes in recent issues of the 'Proceedings' of the Biological Society of Washington. He calls attention to the fact that Illiger proposed *Crypturus* as a substitute for *Tinamus* just as he did *Dysporus* for *Sula*, a fact that the reviewer brought before the A. O. U. Committee, as affecting *Dysporus* many years ago, but he was voted down. No name being avail-

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[1] A Comparative Study of Some Subfossil Remains of Birds from Bermuda, Including the "Cahow." By R. W. Shufeldt. Ann. Carnegie Museum, XIII, Nos. 3–4, pp. 333–418, pll. XVI–XXXI. April 25, 1922.

[2] A new form of Edolius forficatus (Linne). By Outram Bangs and Thomas E. Penard. Proc. N. E. Zool. Club., VIII pp. 25–26. May 1, 1922.

The Northern Form of *Leptotila fulviventris*. By Outram Bangs and Thomas E. Penard. *ibid* pp. 29–30. May 8, 1922.

A new Hummingbird from Surinam. By Thomas E. Penard. *ibid*, pp. 27–28. May 1, 1922.

[3] Notes on the Nomenclature of the Genus *Crypturus* Illiger. Proc. Biol. Soc. Wash., 35, pp. 73–76. March 20, 1922.

able for the Tinamous known as *Crypturus*, Dr. Oberholser proposes *Crypturornis* (p. 74) with *C. cinereus* as type, listing all of the fifty known forms, for the purpose, we suppose, of receiving credit for the "combinations" should zoologists ever revert to a double citation of authorities, and like the botanists regard every new combination as a holy thing to be sought out and catalogued. This listing of all known forms every time a generic name is changed is one of the idiosyncracies of nomenclature that might we think well be dispensed with by all, as it is by most, ornithologists.

Dr. Oberholser also points out that[1] *Inocotis* Reichenbach is antedated by *Pseudibis* Hodgson, and claiming that *Cymindes* Spix is a different name from *Cymindis* Cuv., he substitutes it for *Rostrhamus* Less.

Since, however, we all know that the last word has not been said on the question of what constitutes a different name and there is no general agreement on the matter, it seems folly to overturn well established names on such grounds. They should be left in abeyance until the matter is settled. Dr. Oberholser also revives *Habia* of Blyth and fixes it upon the group now known as *Phoenicothraupis*, necessitating the listing of all of these forms under the new generic name.

In spite of the fact that we do not agree with all of his conclusions, however, Dr. Oberholser is performing a thankless task in setting forth clearly all of these nomenclatural tangles that have to be settled some day and into which few of our ornithologists care much about delving.—W. S.

The Ornithological Journals.

Bird-Lore. XXIV, No. 3. May-June, 1922.

Bonaventure Island and Perce Rock. By Harrison F. Lewis.—A great protected nesting colony of Gannets, Murres, Gulls, Cormorants etc., which "can be visited with ease and comfort."

Two Hummingbird Photographs.—By A. R. Coleman.—Of brooding and feeding birds.

City Birds. By Anne H. Gaylord.—Seventy-six species seen in a small wooded tract in the suburbs of Atlanta, Ga., in fifteen months, eleven resident.

Factors Contributing to the destruction of Birds' Nests and Eggs. By I. N. Gabrielson.—Data on fifty nests—24 destroyed by human agency, 12 by cats or natural enemies and 13 by storm and flood.

Bird Bathing. By E. R. Driver.—Groups birds as "soakers," "dippers" and those that bathe in wet foliage, heavy dew sprinklers, etc. Bird-bath notes by numerous contributors follow.

The educational leaflet treats of the Green-winged Teal. The seasonal reports from various parts of the country are as usual, full of important data, while the Audubon department gives the latest news of bird protection especially the report on the Egret situation in Florida, which is

[1] Ibid, p. 79.

stated to be still "the worst slaughter-grounds for water birds in the United States," while it is the opinion that the Heron family is rapidly approaching extermination in Central Florida.

Bird-Lore. XXIV, No. 4. July-August, 1922.

A Bird Sanctuary in a Small Residential Garden. By Geo. S. Foster.—Excellent description of how one's garden may be made attractive to birds.

A Hummingbird Waif. By Mabel Osgood Wright.—Care of a nesting bird.

My Neighbors, the Nighthawks. By S. R. Mills.—A nesting on a roof at Kingston, Ont.

Joseph Pollah also contributes some admirable photographs of a Yellow-billed Cuckoo at the nest and A. D. McGrew some of the Yellow Warbler. In the Audubon Department Dr. A. A. Allen has an instructive article on Nest-Building and Egg-Laying. There is a plate of the Boat-tailed and Great-tailed Grackles and notes on their plumage.

The Condor. XXIV, No. 3. May-June, 1922.

Miscellaneous Bird Notes from Montana. By Charles L. Whittle.—At Great Falls and Little Belt Mountains, with important discussions of the song of the Orange-crowned Warbler and Townsend's Solitaire.

Wasted Ornithological Material. By W. H. Bergtold.—Plea for the preservation of parasites and stomach contents and the recording of weights and body temperatures.

Notes on American Pine Grosbeaks with the Description of a New Subspecies. By Allan Brooks. *Pinicola enucleator carlottae* (p. 86) Queen Charlotte Islands.

The Aleutian Rosy Finch. By G. Dallas Hanna.—A Life History. with a supplementary account of the eggs by Joseph Mailliard.

The Wilson Bulletin. XXXIV. No. 2. June, 1922.

Bird Notes from Southern Wisconsin. By H. L. Stoddard.—Treats of twenty species, with illustration of Cormorants' nests.

Breeding Warblers around Atlanta, Georgia. By Wm. H. La Prade, Jr.

Notes on the Birds of Cumberland Island, Georgia.—A list of 97 species.

A Mild Winter and its effects on the Migration of Birds at Chicago. By C. W. G. Eifrig.—Early migrants as would be expected were early but not those wintering far to the south.

Birds Seen at the Mouth of the Ohio River. By Gordon Wilson.—Wickliffe, Ky., during August and early September.

The Prairie Chicken in East Central Iowa. By Fred J. Pierce.—A valuable historical article with full account of the trapping and marketing of the bird.

There is also an important paper by Leon J. Cole on the Early History of Bird Banding in America.

Dr. Cole was the first to seriously advocate this method of study in America, and in view of the importance that the work has now attained this detailed record of those connected with its inception are important.

The Oölogist. XXXIX, No. 5. May, 1922.

Camp in a Coal Mine. By R. Boulton.—List of birds seen in central Beaver Co., Pa.

The Oölogist. XXXIX, No. 6. June, 1922.

Some Blackburnian Nests. By R. B. Simpson.—In Warren Co., Pa.

Nesting of the Swainson's Warbler in Atlanta [Ga.]. By W. H. La Prade, Jr.

Summer Residents of Camp Meade, Maryland. By L. R. Wolfe.

Yellow-throated Warbler [breeding] in Dorchester Co., Maryland. No author mentioned.

Ground Nesting of the Brown Thrashers. By E. A. Stoner.—Note on same in July issue.

The Oölogist. XXXIX, No. 6. July, 1922.

The Little Blue Penguin. By L. L. Redeck.—With illustrations from photographs.

The Ibis. (11th Series) IV, No. 3. July, 1922.

The Birds of Jhang District, S. W. Punjab. Part II. Non Passerine Birds. By Hugh Whistler.

Additional Notes on the Japanese species of *Oceanodroma*. By Nagamichi Kuroda.

On the Representative of *Corythornis leucogaster* (Fruser) in the Cameroons and the Congo. By James P. Chapin.—*Corythornis leucogaster batesi* (p. 442) Bitye, southern Cameroon, is described as new, and an additional specimen of *Ispidina leopoldi* is recorded.

On the Birds of the Province of Hupeh in Central China. By J. D. La Touche.

The Arabian Ostrich. By Douglas Carruthers.—An historical record of its distribution.

On the Significance of Certain Characters in Some Charadriine Genera, with a Provisional Classification of the Order Charadriiformes. By Percy R. Lowe.—A most interesting discussion on the probable antiquity of many avian forms, and the suggestion that color-patterns "may be even more persistent than bony structural characters," a claim that the reviewer strongly endorses.

In regard to the Plovers the author points out remarkable skeletal and early plumage differences between *Pluvialis* and *Squatarola* and between *Charadrius* (formerly *Aegialitis*) and *Leucopolius*, the two pairs of genera seeming to parallel one another. *Squatarola* and *Leucopolius* the author

would regard as earlier types still persisting while *Pluvialis* and *Charadrius* are modern derivatives "evolved in time as opposed to space." With the former he would place *Aphriza, Haematopus, Pagolla, Arenaria,* etc., and with the latter a few old world genera. A third subfamily include *Vanellus* and other old world and Neotropical genera as well as *Oxyechus, Himantopus, Eudromias* and *Podasocys.* This is a decidedly novel arrangement but the author is apparently well supported by his facts.

On the Birds collected by Mr. A. F. R. Wollaston during the First Mt. Everest Expedition. By N. B. Kinnear. With Notes by A. F. R. Wollaston—Notes on 60 species with a colored plate of *Pyrrhospiza punicea punicea.*

The Birds of Sind. (Part I). By Claud B. Ticehurst.—A carefully prepared treatise.

Bulletin of the British Ornithologists' Club. CCLXIX. May 20, 1922. Mr. Bannerman describes a collection made by Mr. G. L. Bates in the Cameroon Highlands and proposed four new forms; *Callene batesi* (p. 130), *Apalis bamendae* (p. 131), *Alseonax murinus kumboensis* (p. 131) and *Francolinus bicalcaratus ogilvie-granti* (p. 132).

Kirke Swann discusses Asiatic Kestrels upholding the validity of *Cerchneis tinnunculus dörriesi.*

Bulletin of the British Ornithologists' Club. CCLXX. July 5, 1922. Dr. Hartert describes *Parus caeruleus cyrenaicae* (p. 140) and *Troglodytes troglodytes juniperi* (p. 140) both obtained by him in N. W. Cyrenaica. Col. Meinertzhagen proposes *Certhia himalayana limes* (p. 141) from Gilgit. Mr. Bannerman proposes a new Crested Lark, *Heliocorys modesta saturatior* (p. 141) from Bates' collection in the Cameroon Highlands and J. Delacour a new Parrakeet, *Brotogeris jugularis apurensis* (p. 142) from Camaguan, Venezuela.

CORRESPONDENCE

Group Photographs of the A. O. U.

Editor of 'THE AUK':

I have been trying to collect a full list of the group photographs which have been made from time to time at the various annual meetings of the Union. I hope that any member who has a group photograph not mentioned in the following list will advise the undersigned. There seems to be an impression that other groups were taken at New York, Washington, and Cambridge. The following list includes those photographs which are in the possession of the writer:

New York: Original (founders)	1883
	1913
Washington:	1895
	1898
	1910
	1920
Philadelphia:	1899
	1916
San Francisco:	1915.

Biological Survey,
Washington, D. C.
August 7, 1922.

A. K. Fisher.

Life Histories of North American Birds

Editor of 'The Auk':

Realizing that no one man can know all there is to know about all the birds and that the completeness of the 'Life Histories of North American Birds' depends upan the coöperation which the author receives from others, I wish to make this report of progress and appeal to your readers for contributions.

Two volumes have been published and the third, containing the Petrels and Pelicans and their Allies, is printed and should soon be out. The manuscript for the fourth volume, containing the Ducks, up to and including the Ring-necked Duck, is now in Washington in finished form and ready for publication. It is not too late to add to this, when I correct the galley proof, any notes of importance on habits or distribution, nor is it too late to substitute any particularly fine photographs for those that I have already selected.

I am now at work on the fifth volume, which will contain the remainder of the Ducks and the Geese and Swans. I expect to finish this during the winter and send it to the publishers in the spring. The life histories are practically all written, subject to revision, but the photographs have not been selected.

I have no notes on the courtship of the American and White-winged Scoters or of any of the Geese, except the Canada, or on any of the Swans or Tree Ducks. I have no nesting photographs of the Harlequin Duck, Barrow's Golden-eye, any Geese except the White-fronted and Canada, any Swans or any Tree Ducks. I should be glad to receive contributions of notes or photographs to fill in any of the gaps referred to above. Or I should be glad to correspond with anyone who has anything else to offer. I am, of course, well supplied with photographs illustrating nests, eggs and young of all the common species, but there are many gaps still to be filled. I am trying to read everything that is published on American birds, but I have no access to private notes, that have not been published, unless they are sent in as contributions. I shall soon begin work on the

sixth volume, which will contain the Herons and Rails and their allies. Contributions for this would be welcome at any time. Contributors will receive full credit for whatever material they send in and, if it is material that I can use, their names will be placed on the mailing list to receive the volumes when published.

Those who have seen the earlier volumes can understand what is wanted. Hoping for some generous cooperation I am

Very truly yours,

A. C. BENT,

Taunton, Mass.

NOTES AND NEWS

DR. MAXIMILIAN FÜRBRINGER, Professor of Anatomy at the University of Heidelberg, died at Heidelberg, Germany, March 6, 1920. He was born at Wittenberg, Germany, Jan. 30, 1846 and received his early education at the gymnasium at Gera. From 1865 to 1869 he studied natural history and from 1870 to 1873 pursued a course in medicine at Jena and Berlin. At an early age he devoted his attention to the subject of the anatomy of vertebrates and in 1879 was appointed Professor of Anatomy and Director of the Anatomical Institute at Amsterdam. In 1888 he became Professor of Anatomy at Jena and in 1901 succeeded to the same chair at Heidelberg, a position previously held by his former master Carl Gegenbaur. Here he remained until his death.

As an avian morphologist and student of the evolution of birds, Fürbringer had few peers and possibly no superior. His great work 'Untersuchungen zur Morphologie und Systematik der Vögel,' in two volumes, which appeared at Amsterdam in 1888 contains an outline classification of birds that was characterized by Prof. Alfred Newton as "unquestionably the most remarkable recent contribution to systematic ornithology." In recognition of this work he was elected a Corresponding Member of the American Ornithologists' Union in 1891 and in 1916 was made an Honorary Fellow. Among his other works may be mentioned a summary of existing knowledge of the anatomy of birds contributed to the Reports of the Second International Ornithological Congress in 1891 and a paper of some 150 pages to the 'Jenaische Zeitschrift für Naturwissenschaft' in 1902. These were followed in 1903 by a Biography of Carl Gegenbaur and in 1909 by a new edition of Gegenbaur's 'Anatomy of Man.' Unfortunately these great works in German are not accessible to most English and American ornithologists although brief notices of the 'Untersuchungen' appeared in the 'The Ibis' and in 'Nature' in 1888 and a review of his report to the International Ornithological Congress on avian anatomy was published in 'The Ibis' for 1903, p. 614. —T. S. P.

HANS CHRISTIAN CORNELIUS MORTENSEN, the pioneer of modern bird banding activities, died at his home in Viborg, Denmark, June 7, 1921, following an apoplectic attack. Although never associated with the American Ornithologists' Union, the name of Herr Mortensen must always be cited when referring to the method of ornithological research that he inaugurated.

He was born at Jonstrup, Denmark, August 27, 1856. receiving his education there and at Copenhagen, where he was also engaged for several years as a teacher. He moved to Viborg in 1888 where he lived for the rest of his life, chiefly engaged with the duties of head master of the Cathedral School. Poor health forced him to retire from scholastic duties in 1919, and the short period of his life that then remained to him, was apparently devoted entirely to the study of birds.

According to his own account,[1] Herr Mortensen first attempted bird banding work in 1890 when he used zinc bands in marking a small number of Starlings (*Sturnus vulgaris*). This experiment was a failure and it was not until 1899 that he used aluminum bands, which in that year were attached to 165 Starlings. The success of this and his subsequent experiments was so great that bird banding as a method of original research, came rapidly into prominence in almost every European country.[2]

The work of Herr Mortensen has been continuous and his efforts were directed particularly to investigations of the migrations of Storks, Teals, Pintails, Starlings and some Raptores, principally Buzzards and Goshawks. Published reports of considerable importance, dealing with the first four species named, have appeared from his pen, mostly in the 'Dansk Ornithologisk Forenings Tidsskrift.' According to a biographical account by Dr. O. Helms, that appeared in the above mentioned journal for September, 1921, Herr Mortensen's list of bird papers covers seventeen titles, almost all of which are based on information secured from over 6000 birds that were banded by him with the aid of a few assistants.—FREDERICK C. LINCOLN.

ROY CHURCH WOODWORTH, an Associate of the Union for the past three years, and a successful man of affairs of Kansas City, Missouri, died suddenly of heart disease at his home on June 29, 1922. He was born in Middlebury, Indiana, September 30, 1877, and moved to Kansas City with his parents when he was ten years old. After passing through the public schools there, he attended the University of Michigan for six years where he graduated from both the academic and law departments and won many collegiate honors.

Unlike most modern business men Mr. Woodworth had a rare appreciation of the elusive harmonies and subtle beauties of nature, and spent

[1] 'Fra Fuglemaerkestationen i Viborg.' Dansk Ornithologisk Forenings Tidsskrift, 1912, pp. 98–127.

[2] cf. Auk, 1921, pp. 217–228. 'The History and Purposes of Bird Banding.' By Frederick C. Lincoln.

much of his spare time in the open places attending more particularly to bird song. His boundless and irrepressible delight in bird music, and his constant and diligent search for authentic information along this line had enabled him to make rapid progress in the study during the past few years, and had he been spared, would doubtless have led to his specializing in this department to some purpose. He was an enthusiastic member of a small group of intensive bird students all of whom can testify to his wholesome and stimulating traits of character, and to whom, as well as to his hosts of other friends, his death was a serious and ireparable loss.—HARRY HARRIS.

Mr. Howard H. Cleaves formerly curator of the Staten Island Institute of Sciences, later with the N. Y. State Conservation Commission and recently managing director of the Natural History Museum at San Diego, has now become secretary of the Wild Life League at Clarksburg, W. Va.

The A. O. U. is deeply indebted to Mr. S. Prentiss Baldwin who has generously financed the publication of the papers by himself, Mr. Talbot and Mr. Lincoln, on various phases of bird banding which have appeared in 'The Auk' during the past few years. To Mr. Chas. L. Whittle we are similarly indebted in connection with the paper on the Arboretum Mockingbird.

As we go to press we are in receipt of the circular of the local committee relative to the Chicago meeting of the A. O. U., October 23–26, 1922. The scientific sessions will be held in the Field Museum of Natural History, where an exhibition of bird paintings and photographs will be arranged to which all are requested to contribute. There will be a field trip to the Indiana Sand Dunes on Friday, October 27, and the usual dinner on Wednesday evening. Headquarters will be at the Auditorium Hotel, Michigan Boulevard and Congress St.

The Committee have evidently planned a most enjoyable program and it remains for the members to make the meeting a notable one. Just as the eastern ornithologists have been responsible for the large attendances at meetings on the Atlantic coast and the Californians at those on the Pacific so the responsibility this year rests on our Members in the Mississippi Valley, everyone of whom should make an earnest effort to be present and take an active part in the program. With the cooperation of those from other districts the meeting should be the most representative that has been held.

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ERRATA

Page xxiv, after line 13, insert CRANDALL, LEE S., N. Y. Zool. Park, New York, 1909.
" 98, line 21, for Lake Chah, read Lake Chad.
" 104, " 29 and 31, for **cascarca** read **casarca.**
" 131, " 18, for deserves, read deserves.
" 135, " 32, for *Dacaeum*, read *Dicaeum*.
" 143, lines 2 and 3, for Lafresnay, read Lafresnaye.
" 148, line 18 from bottom, for Iowian, read Ionian.
" " " 17 " " for Acarnama, read Acarnania.
" " " 11 " " for Ornithologic, read Ornithologie.
" " " 10 " " for Geographie, read Geographic.
" " " 4 " " for Iowen, read Ionien.
" 149, line 14, for less, read more.
" 231, " 4, for **melanocephala**, read **ludoviciana.**
" 242, " 38, for **Parus,** read **Penthestes.**
" 248, " 26, for Evermann, read Eversmann.
" 448, " 32, for *Platycerus*, read *Platycercus*.

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